DOCUMENT RESUME

ED 313 208 RC 017 352

AUTHOR	Wolanyk, Betty
TITLE	New York Agriculture in the Classroom. Grade 5.
INSTITUTION	New York Farm Bureau, Inc., Albany.; New York State Dept. of Agriculture and Markets, Albany.; New York State Education Dept., Albany.; State Univ. of New York, Ithaca. Coll. of Agriculture and Life Sciences at Cornell Univ.
PUB DATE	87
NOTE	202p.; Posters will not reproduce.
AVAILABLE FROM	Cornell University, Dept. of Education, 24 Roberts Hall, Ithaca, NY 14853 ($54.00 postpaid).
PUB TYPE	Guides - Classroom Use - Materials (For Learner) (051) -- Reference Materials - Bibliographies (131)
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	Agricultural Machinery; Agricultural Occupations; *Agricultural Production; *Agriculture; *Animals; Class Activities; Educational Resources; Elementary School Science; *Food; Grade 5; Intermediate Grades; Mathematics Materials; Rural Education; Science Activities; Social Studies; Writing Exercises
IDENTIFIERS	New York; *Plants (Botany)

ABSTRACT

These classroom exercises have been designed to maximize teacher time, while creating an awareness of our food and fiber system among New York fifth graders. The materials are color-coded, falling into four categories: language arts, mathematics, science, and social studies. Each exercise includes background information, concepts, and objectives for the teacher. The language arts series encourages students to create haiku, telegrams, advertising, and wall posters to communicate facts and ideas about agriculture. The mathematics section offers word problems having to do with agricultural production. Activities in the science section focus on plant and animal life studies. Students are encouraged to discuss the absence of life on the moon, classify animals, cultivate and observe real plants in the classroom, and monitor various variables of plant growth. The social studies materials help children differentiate between past and present agricultural practices and understand how technology facilitates food production. Students are also encouraged to learn about agricultural regions of the country and agricultural careers and to recognize interrelationships among different professions. The activities in this section include crossword puzzles, class discussion, inviting a guest speaker, and creating a timeline. Additional resources include "New York's Big Apple" (a booklet on New York agriculture), two posters, a guide to agricultural professions, and a U.S. Department of Agriculture bibliography of 328 educational resources about agriculture. (TES)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Elizebeth Wolanyk

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

The New York Agriculture in the Classroom program is a partnership effort of the Cornell University College of Agriculture and Life Sciences, the State Education Department, New York Farm Bureau, and New York State Department of Agriculture and Markets. Funding to print and distribute these materials is provided by the New York State Legislature.

NEW YORK AGRICULTURE IN THE CLASSROOM
Grade 5

by
Betty Wolanyk

DEDICATION

This work is dedicated to Janet St. Pierre. Her cheerful, patient assistance has been invaluable. It is greatly appreciated!

Thanks to the following for their contributions:

James Adams
Colleen Blissard
Maria Jasper
Theresa W. Kenyon
Long Island Farm Bureau
National Cotton Council
New York Division of the Pork Council Women
New York State Department of Agriculture and Markets
Janet St. Pierre
Western NY Apple Growers, Assn.
United States Department of Agriculture

typing: Sue Shanahan

editing: Phyllis Joyce
Donna Wanner
Lori Lachman

artwork: Jethro Abplanalp-Gaede
Marion Van Soest
Mary Brenner
Marilyn Luke
Ellen Alexander
Patty Harrington Keagle
Debbie Woods

project directors:

Daryle E. Foster, Ph.D.
Director
Instructional Materials Service
Department of Education
Cornell University
Ithaca, New York 14853

Bill Umscheid
Program Specialist
4-H Youth Development
Cornell Coop. Extension
Cornell University
Ithaca, New York 14853

Funding for distribution is provided by the New York State Legislature.

New York Agriculture in the Classroom

New York Farm Bureau, Inc.
New York State College of Agriculture and Life Sciences
New York State Department of Agriculture and Markets
New York State Education Department

Cornell University
Department of Education
24 Roberts Hall
Ithaca, New York 14853-5901
(607) 255-8122

November 1, 1987

Dear Educator:

These materials have been designed to maximize teacher time, address the concepts in the syllabus for each subject area and create an awareness of our food and fiber system. A conscious effort has been made to develop materials that were active in nature. The old adage: "Tell me, I'll forget; show me, I may remember; but, involve me, and I'll understand" has been our philosophy in developing these materials.

As you no doubt have already noticed, the materials are color coded. All teacher materials and answer keys are color-coded as follows:

pink...	Language Arts
yellow.......................................	Mathematics
green.......................................	Science
blue..	Social Studies

Student materials are white to eliminate problems in copying.

In the top, right-hand corner of each page is the major concept covered by that activity. Other concepts are indicated on the Teacher Material pages. The Langugage Arts materials also indicate which syllabus (of the five) was used. At the time this work was done, some of the syllabi were under revision. If this was the case, either the old syllabus or the draft of the new one was used. Adjustments will have to be made after the revised syllabus is made available.

It is crucial for you to understand that these materials are not intended to add to the curriculum. They simply offer a way to meet the concepts in the syllabus.

Thank you. Good luck with your efforts. I hope that you find these materials useful and enjoyable.

Sincerely,

Betty Wolanyk

Betty Wolanyk
Extension Associate

ss

NEW YORK AGRICULTURE IN THE CLASSROOM

ADVISORY COMMITTEE

Michael J. Bragman
(Chair, Agriculture Committee)
Legislative Office Building
Room 828
Albany, NY 12248

Martha Borgeson
(Asst. Commissioner for
Mktg. & Promotion)
Dept. of Agr. & Markets
1 Winners Circle
Albany, NY 12235

Calvin Brown
(Pork Producer)
Rosewood Farms
Whiskey Hill Road
Waterloo, NY 13165

William Deming
(Executive Director)
Rural Schools Program
293 Roberts Hall
Cornell University
Ithaca, NY 14853-5901

William Drake (Professor)
Agr. & Occupational Ed.
306A Roberts Hall
Department of Education
Cornell University
Ithaca, NY 14853-5901

Melvin Dye (Guidance Counselor)
Cuba Central School
Cuba, NY 14727

George Good (Professor)
Flor. & Ornamental Hort.
Cooperative Extension
Cornell University
Ithaca, NY 14853

Edward Heslop
New York Farm Bureau
Route 9W
P.O. Box 100
Glenmont, NY 12077

John Higham (Associate)
Bur. of Science Education
NYS Dept. of Education
302 Education Building
Washington Avenue
Albany, NY 12234

Margaret J. Hill
(Director of Public Relations)
Agway, Inc.
P.O. Box 4933
Syracuse, NY 13225

John Mann
(Coop. Extension Agent)
Farm, Home & 4-H Center
99 N. Broad Street
Norwich, NY 13815

Daniel Moskwa (Associate)
Bur. of Trade, Tech. & Agr.
NYS Education Department
99 Washington Avenue
Albany, NY 12234

Edwin Slusarczyk
(President & Gen. Mgr.)
Ag Radio Network, Inc.
Box 781
Utica, NY 13503

Rebecca DeSmith
(Elementary Teacher)
Phelps-Clifton Springs Sch. Dist.
Clifton Springs Elementary School
Clifton Springs, NY 14432

Bert Spaeth
(Vo-Ag Teacher)
Letchworth Central School
Gainesville, NY 14066

PILOT TEACHERS

New York Agriculture in the Classroom would like to recognize and thank the following teachers for piloting these materials:

Donald Beach
Penn Yan Elementary
Penn Yan

Judy Cohen
W. Middle Island Elem. Sch.
Middle Island

Diane Couchman
Hillcrest Elem. School
Chenango Valley

Anne Emerson
Penn Yan Elementary
Penn Yan

Nancy Francis
Setauket School
Setauket

Janice Goldstein
West Middle Island Elem. Sch.
Middle Island

Carol Hall
Penn Yan Elementary Sch.
Penn Yan

Eva Harp
H.W. Smith Elementary Sch.
Syracuse

Maryann Laidlaw
H.W. Smith Elementary Sch.
Syracuse

John Miles
Penn Yan Elementary School
Penn Yan

Brian Minor
Penn Yan Elementary School
Penn Yan

Mary Moreland
H.W. Smith Elementary School
Syracuse

Judy Mydzin
Hamilton Elementary School
Tonawanda

Mrs. Royston
Munsey Park Elem. School
Manhasset

Linda Smith
Clifton Springs Elem. School
Clifton Springs

Janet St. Pierre
Ithaca City School District
Ithaca

Steve Strumlock
H.W. Smith Elementary School
Syracuse

Terry Test
Penn Yan Elementary School
Penn Yan

Dan Wehn
W. Middle Island Elem. School
Middle Island

Flora Workman
H.W. Smith Elem. School
Syracuse

TABLE OF CONTENTS

LANGUAGE ARTS

	Notebook pages	Booklet pages
"Drawing World Pictures" (Haiku) Composition - to express self	1-7	
"New Yorkers Who Made History" Telegram Composition - to express self	8-14	
Vocabulary Activities Reading - vocabulary	15-16	14-15 28-31
"Complex Cotton" - Advertisement/Commercial Composition - to explain	17-18	6-8
"Rebuild the Empire" Composition - to explain	19 -22	34-35
"Quotations" Composition - to explain.	23-26	

MATHEMATICS

	Notebook pages	Booklet pages
Teacher Materials	27	
"Today's Tractors" - Word Problems multiplication, division	28-31	
"The Agricultural Dollar" - Word Problems multiplication	32-35	
"Agricultural Statistics" - Word Problems fractions, percentages	36-39	
Teacher Materials	40	

	Notebook pages	Booklet pages
"Fowl Facts and Poultry Puzzles" - Word Problems multiplication, decimals	41-46	
"Livestock Production" - Word Problems multiplication, division, decimals	47-50	

SCIENCE

"A Trip to the Moon" Life Science-II A - 2.1, 2.2, 2.3, 2.4	51-56	
"Classifying Animals" Life Science-III A - 2	57-59	
"Growing a Green Thumb" - Teacher Materials	60-65	
"How Light Affects Plant Growth" Life Science-III A - 1.1, 1.22, 1.3	66-72	
"How Soil Affects Plant Growth" Life Science-III A - 1.1, I.22, 1.3	73-80	
Plant Structure - flowers Life Science-III A - 1.22	81-83	
Plant Structure - roots Life Science-IIIA - 1.21	84	

SOCIAL STUDIES

"Change" change, technology	85-86	
"Grape Juice, Milk and Flowers" technology, interdependence, scarcity	87-92	10
Careers scarcity, environment, empathy	93-97	21-22

	Notebook pages	Booklet pages
"Life is a Pretzel" interdependence	98	12-13
"America's Food and Fibers" culture, interdependence, scarcity	99	27-29
"Coming to America" culture, change	100	
"George Washington and Thomas Jefferson as Farmers" citizenship, change, culture	101-108	
"Agricultural Inventions" - timeline technology	109-120	
"Agricultural Geography" interdependence, environment	121-129	18-19
"New York's Exports" interdependence, scarcity	130-131	32-33

RESOURCES

"New York's Big Apple"

"New York Agricultural Statistics"

Posters: "Coming to America"
"Cotton from field to fabric"

A.S.A.E. Catalog - "Looking Back"

U.S.D.A. Resource Guide

"Energize the Green Machine"

TEACHER MATERIALS

CONCEPT:

Composition - to express self
- to describe

Reading - vocabulary
- grammar

OBJECTIVES:

1. The students will use the haiku as a form for the expression of an appreciation of nature.

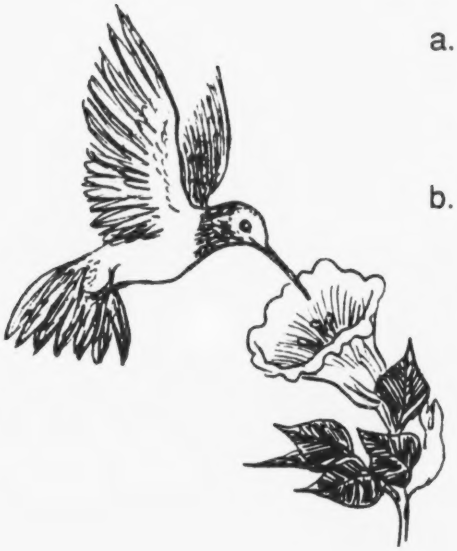
2. The students will develop skills in observation and imagery.

BACKGROUND: An appreciation of the natural world is important in our self-fulfillment as well as in making decisions regarding the management of our resources. Developing the skills of keen observation and sensory awareness are well integrated with feelings of appreciation and wonder in this lesson on haiku.

ACTIVITIES:

1. Have students read "Drawing Word Pictures."

   Allow students an opportunity to talk about scenes or experiences in nature which have been especially meaningful to them.



   a. Read the haiku, allowing time to develop a sense of the scenes represented in the haiku.

   b. If possible, go outdoors to an area where the students can observe and enjoy nature. This can be done in conjunction with the science lesson on wildlife.

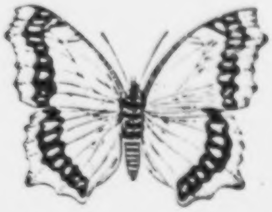
c. Allow a quiet time for the students to close their eyes, relax, and visualize a scene from nature. Encourage vivid visualization of details.

d. If students have trouble visualizing a nature scene, have them close their eyes while you "guide" their visualization of a walk through the park or through the woods.

e. Encourage the students to pay attention to the way they feel as they are experiencing nature, either directly or in their imaginations.

3. Have the students write their own haiku, drawing upon their sensory experiences and their feelings.
4. The finished haiku may be illustrated and displayed on the bulletin board.
5. Make a booklet of examples to share with parents.
6. Include this lesson with other poetry activities.
7. Have the students complete the lesson on syllables as a pre-requisite to this lesson.

Name ______________________ Date ____________



SYLLABLES

Divide these words into syllables and write the number of syllables after each.

1. fluttering ______________________________

____

2. surprised ______________________________

____

3. illustrated ______________________________

____

4. outlined ______________________________

____

5. buzzing ______________________________

____

6. beautifully ______________________________

____

7. simply ______________________________

____

8. whispering

9. willow

10. lightning

11. lightening

12. magnolia

13. hummingbird

14. sycamore

15. listening

16. tamarack

17. hibiscus

18. marigold ______________________________________

____

19. zinnia ______________________________________

____

20. impatiens ______________________________________

____

Composition
- to express self

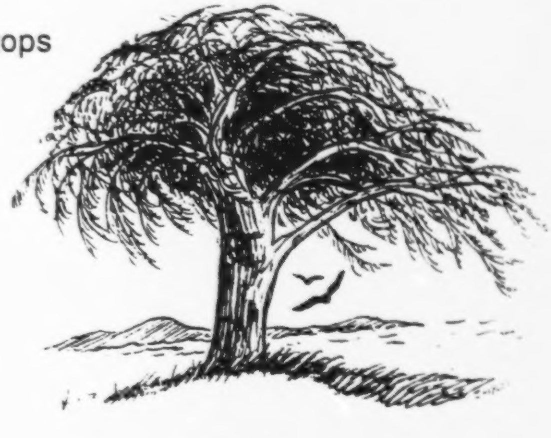
DRAWING WORD PICTURES

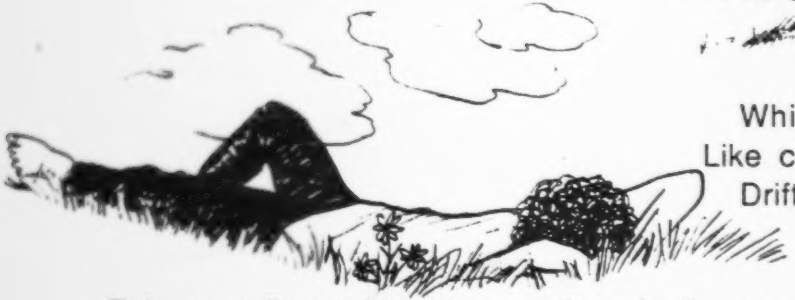
When we are close to nature, we often have special feelings that are hard to express. Poetry is one way to draw a word picture of special feelings.

Haiku is a beautiful Japanese form of poetry which describes things in nature. Every haiku has 3 lines, which do not rhyme. In Japan there are always 17 syllables in a haiku. You can try to write a haiku with five syllables in the first line, seven syllables in the second line, and five syllables in the third line, but don't worry too much about having the right number of syllables. It is more important to think of words that draw a picture and express your feelings.

Read these haiku and let them draw a picture in your mind.

The soft, warm breeze
Makes music in the treetops
The harp of nature.





White, fluffy clouds,
Like cotton balls in the sky
Drift over my head.

Take a walk outside - in a park or in the woods. Look at the beauty of nature. Do you see any birds, squirrels, or other small animals? Are there big, strong trees? Can you find small, delicate plants or flowers? Do you see clouds drifting across the sky?

How does the air feel on your skin? Is there a slight breeze? Is the sun warm on your face? What can you smell? Does the air smell fresh and clean? Does it carry the sweetness of flowers, or the smell of the earth after a rain? What colors do you see? Are there the fresh green of young plants in spring, the golds and reds of autumn, or a white blanket of snow?

If you can't actually walk outdoors, you can close your eyes and imagine the sights, sounds, and smells of nature, imagine all the details of one of your favorite places and remember how it makes you feel.

Think of something special to put into your own, special word picture.

TEACHER MATERIALS

CONCEPT: Composition - to explain: telegram
Social Studies - technology
- change
- culture

OBJECTIVES: The student will gain an understanding of a famous New Yorker's contributions to agriculture and society. By placing themselves in the person's shoes, and announcing in a telegram their success, the student will describe the achievement.

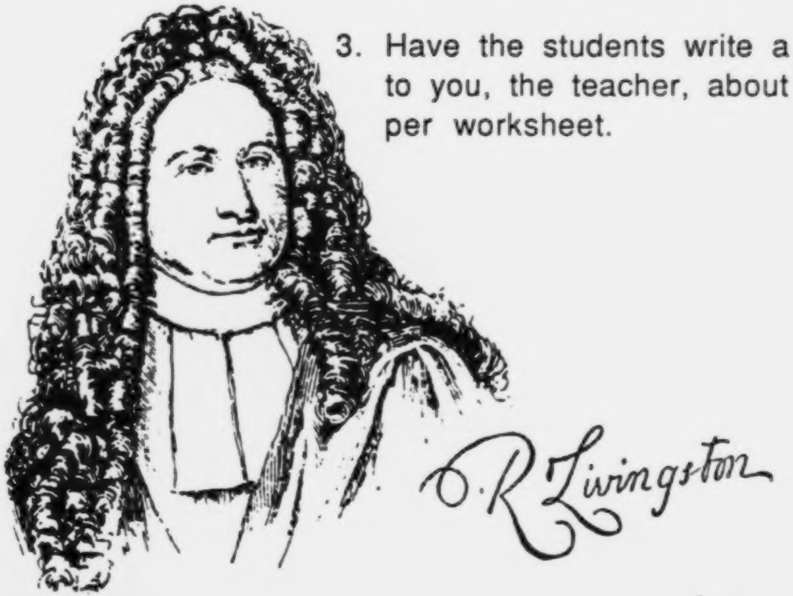
BACKGROUND: Oftentimes, the accomplishments of famous people are taken for granted. Many small events, innovations, and inventions have led us to today. The accompanying list of New Yorkers should give the students a flavor of those changes.

ACTIVITIES:

1. Have the students read the information on the following sheets - New Yorkers who made Agricultural History.

2. Have the students select the person/event/invention that interests them the most.

3. Have the students write a telegram addressed to you, the teacher, about the achievement as per worksheet.



Name ______________________________ Date _________________

DIRECTIONS: Select one of the New Yorkers who made history and write a telegram about one of his or her contributions. Address the telegram to your teacher and describe one of the achievements, events or inventions of this person. Sign the telegram with your name. Under your name print the famous person's name.

NEW YORKERS WHO MADE HISTORY

ABBE, Cleveland	Cleveland Abbe was born in New York City in 1838. He was the first official weather forecaster in the United States. In 1870, when the U.S. Weather Service was authorized, he was the only man experienced in drawing weather maps.
ADAMS, Henry Cullen	Henry Cullen Adams was born in 1850 in Oneida County, New York. While in Congress, representing Wisconsin, he was responsible for a meat inspection law, and the admission of Arizona and New Mexico as states. He also introduced and helped pass a bill increasing federal funding for agricultural experimental stations.
APPLEBY, John F.	John F. Appleby was born in Oneida County, New York in 1840. In 1879 he patented a twine knotter for grain sheaves that operated behind a reaper and was eventually used on all grain binders.
ATWATER, Wilber O.	Wilber O. Atwater was born in Johnsburg, New York in 1844. He was the inventor of calories. He developed an apparatus to measure the caloric value of various foodstuffs. He also proved that legumes gathered free nitrogen from the air and left it in the soil (nitrogen fixation). He was the first USDA Director of the Office of Experimental Stations and one of agriculture's most distinguished scientists.

BABCOCK, Howard E.	Howard E. Babcock was born in Gilbertsville, New York in 1889. He was the principle organizer of the "Grange League Federation" (G.L.F.) now known as Agway.
BAILEY, Liberty Hyde...............	Liberty Hyde Bailey was born in Michigan in 1858. He was Dean of the Cornell College of Agriculture from 1903 to 1913. He collected over 125,000 specimens of plants and donated them to Cornell. He chaired Theodore Roosevelt's Country Life Commission and wrote its report in 1908.
CARRIER, Willis Haviland......	Willis H. Carrier was born in Angola, New York in 1876. He graduated from Cornell University. In 1911, he presented the theory and practical data upon which air conditioning was founded.
CASE, Jerome Increase...........	Jerome I. Case was born in Williamstown, New York in 1818. He combined the separator and thresher thereby eliminating the need for a fanning mill in 1842. This machine was known as a combine. By 1857 he was making 1,600 machines per year. He later expanded to sell plows, tractors and other farm machines as well as manufacture them.
COVILLE, Vernon Frederick..	Vernon F. Coville was born in Preston, New York in 1867. While working with Elizabeth White of New Jersey, he tamed the wild blueberry. Today the blueberry is a multi-million dollar crop.
DOANE, Howard D.	Howard D. Doane was born in Mexico, New York in 1883. He organized the Doane Agricultural Service for Farm

	Management. It is still in existence today as one of the largest farm management service organizations. This system provides advice to farmers concerning business decisions.
FISHER, Albert Kenrick	Albert K. Fisher was born in Ossining, New York in 1856. He proved that predatory birds were not generally harmful to poultry and game birds. But rather, their consumption of rodents made them quite useful to farmers. As a direct result, most states repealed their laws offering bounties on predatory birds such as hawks and owls. Farmers gradually learned not to shoot these friends. Only 3 out of 73 species he examined had consumed poultry or game birds. He dissected 2,690 birds.
GALPIN, Charles Josiah.........	Charles J. Galpin was born in Hamilton, New York in 1864. He is considered the father of Rural Sociology. While working for the USDA, he wrote four books that began the study of rural populations. He was decorated by the King of Belgium.
HOARD, William	William Hoard was born in Munnsville, New York in 1836. He founded the Hoard's Dairyman in 1885 which is still in existence as the leading dairy production magazine. It has had a national influence on the improvement of the dairy industry.
KING, Richard	Richard King was born in Orange County, New York in 1825. He established the first ranch south of Corpus Christi which was later expanded into the King Ranch. The King Ranch is the largest

	ranch in the world, nearly a million acres. He was the original marketer of long-horn cattle from Texas and built the railroad from Corpus Christi to Laredo.
KNAPP, Seaman A.	Seaman A. Knapp was born in Schroon Lake, New York in 1833. He promoted the colonization of Louisiana, and developed the Louisiana rice industry. He showed the Texas farmers how to fight the cotton boll weevil. This led to the county agent system to disseminate information which is now known as Cooperative Extension.
LIVINGSTON, Robert R.	Robert R. Livingston was born in New York City in 1746. He helped draft the Declaration of Independence. He introduced into the United States the first Merino sheep - a specialized breed with excellent wool quality. He was also one of the commissioners who negotiated the Louisiana pur- chase.
MORSE, William J.	William J. Morse was born in Lowville, New York in 1884. He traveled through China, Manchuria, Korea, and Japan to bring back 5,000 samples of soybean seed representing 2,000 varieties. Later, while working for the USDA, he doubled those numbers. From these were developed the varieties of soybeans that are currently used on farms.
MORTON, Sterling J.	Sterling J. Morton was born in Adams, New York in 1832. He was founder of Arbor Day, and the third Secretary of Agriculture from 1893-1897.

MYERS, William Irving...........	William I. Myers was born in Lowman, New York in 1891. He was Governor of the Farm Credit Administration and Dean of the Cornell College of Agriculture from 1948-1959.
POWELL, George Harold...........	George H. Powell was born in Ghent, New York in 1872. He was a leader in organizing and managing the California Fruit Growers Exchange (now Sunkist, Inc.). He headed the Perishable Food Division of the United States Department of Agriculture.
PRINCE, William II...................	William Prince II was born in Flushing, Long Island in 1766. As an importer and exporter of fruit plants and trees, he introduced a new grape, and named the Bartlett pear.
PRINCE, William Robert.	William R. Prince was born in Flushing, Long Island in 1795. He introduced the culture of sorghum and osiers, and attempted to establish the culture of silk.
RICE, James E............................	James E. Rice was born in New York state in 1865. He was named the father of American poultry.
ROCKEFELLER, John D..............	John D. Rockefeller was born in Richford, New York in 1839. He fostered the refining and distribution system for petroleum which enabled farmers to replace candles with kerosene lamps.

TEACHER MATERIALS

CONCEPT:
Reading - vocabulary
Language - grammar
Composition - to describe,
- to explain,
- to express self

OBJECTIVE: The students will become familiar with agricultural terminology.

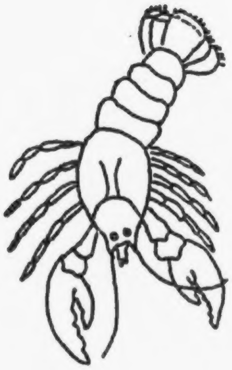
BACKGROUND: Throughout most of human history, the total population was responsible for the production and processing of food and fiber. Today, in the United States, less than 3% of our population is farming. Another 21% is directly employed in the rest of the food and fiber system. As a result of the move away from farming, terms which were a common part of everyone's language are no longer used or understood by the general population.

ACTIVITIES:

1. Have the students complete the crossword puzzle, "Indian Words" on pages 28-29 in New York's Big Apple.

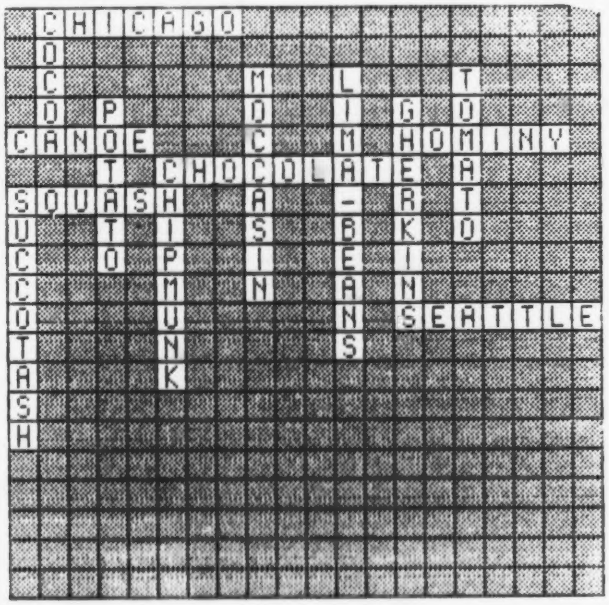
2. Have the students complete the word find, "Food From the Sea" on pages 14-15 in New York's Big Apple.

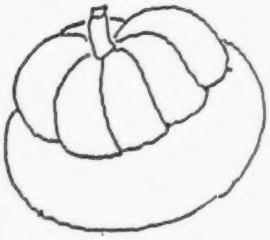
3. Have the students read "Agricultural ABC's" on pages 30-31 in New York's Big Apple. Have them define any words which are new to them by finding the words in the dictionary.



4. Have the students select words from "Agricultural ABC's" in New York's Big Apple and write a fictional story using those words properly.

Answers: INDIAN WORDS


CHICAGO
COCOA
CANOE
POTATO
CHOCOLATE
SQUASH
SUCCOTASH
CHIPMUNK
MOCCASIN
LIMA-BEANS
GHERKIN
TOMATO
HOMINY
SEATTLE



FOOD FROM THE SEA

M X T S B L A C K F I S H F D Y S Q
A S P O A L K R T W A T C X B H N R
K S G B Y N H T E H A R D C L A M S
O V O Y S T E R S N L I M O O W U Q
S O F T C L A M S S X P U N W E J U
H F S T A S L K B T O E S C F A O I
A A S B L U E F I S H D S H I K F D
R Q E E L T Y B J D Y B E H S F K F
K W E W O T R J G B V A L D H I U L
P I R T P O R G I E S S S V C S I U
A I E O S E A B A S S S U P N H T K
F L O U N D E R H A R D C R A B S E
A S L O B S T E R S W O R D F I S H

TEACHER MATERIALS

CONCEPTS:

Language Arts - Composition - to persuade
- Reading - for content

Social Studies - Interdependence
- Change
- Technology

Art

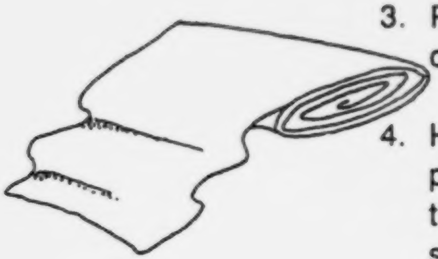
OBJECTIVE: The students will recognize the effects upon agriculture of new products and cultural preferences.

BACKGROUND: The development of man-made and synthetic materials and the changing styles and preferences in our culture have an impact upon agriculture. This lesson is designed to demonstrate those effects in both the food and fiber industries.

ACTIVITIES:

1. Show the video tape "*Cotton: Nature's Food & Fiber Plant*" available free of charge by request from; National Cotton Council, P.O. Box 12285, Memphis, Tenn. 38112.

2. Make use of the placemat in the resource section; *Cotton Nature's Food & Fiber Plant.*



3. Place the poster "Cotton from Field to Fabric" on the bulletin board.

4. Have the students read "Complex Cotton" on pages 6-8 in *New York's Big Apple.* . Discuss the questions asked in the story. Have students read the labels in their clothes to determine whether they are natural, synthetic, or a combination.

5. Ask students to identify as many products as they can that replace real products: cotton, wool, dairy products, and sugar. You may wish to bring some of these products to class to let students read the labels. Discuss the probable effects of these new products upon agriculture and nutrition. For example - milk replacements include all types of coffee whiteners, artificial cheeses, artificial milk, etc.

6. Discuss the role of advertising in influencing people's preferences for various foods and clothing styles.

   Consider:
   - colors
   - size of ads
   - celebrity endorsements
   - free gift offers
   - photos on package

7. Identify how groups are labeling "Real" commodities; The Real Seal, Cotton logo, and Wool logo.

8. Have students design their own advertisements to promote an agricultural product of their choice. They may draw or paint a picture to accompany a slogan or write and act out a TV commerical.

9. As an additional resource make use of the book Cotton, by Millicent Selsam, William Morrow Co., New York, NY 1982.

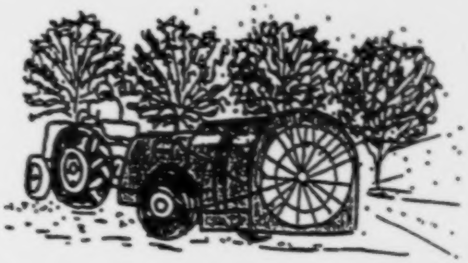
TEACHER MATERIALS

CONCEPTS: Composition - to explain
- to describe
Science - Life Science II A- 1.1, 1.2, 1.3 1.5
Reading - comprehension
Language - grammar
Mathematics - sequencing
Social Studies - scarcity
(economic pp. 46, 48, 54)
- environment (geographic p. 40)

BACKGROUND: The apple tree of today is far different from its ancestor. Apples themselves are larger, firmer, more red, and are stored for longer periods of time.

The seeds of an apple will not actually produce a tree that will produce the same apple. In other words, apples do not breed true. Like humans and animals, the offspring of an apple tree are a combination of both parents. The apple tree is a plant that must be cross-pollinated in order to produce fruit. Bees carry the pollen of one variety such as an Ida Red to fertilize the ovum of another variety such as the Empire. An Empire blossom cannot be fertilized by Empire pollen.

The scenario portrayed in New York's Big Apple is not the actual process to produce a commercial orchard. It would more likely be an experimental orchard to develop new varieties of apples. The real picture of producing a commercial orchard would be that a small branch is grated onto a root stock. That branch would be from an existing Empire tree.



BACKGROUND:
(continued)

The root stock selected would also carry certain traits. Today's trees are generally dwarf. More trees can be planted per acre and they are more easily managed. For more information, contact the County Cornell Cooperative Extension Office.

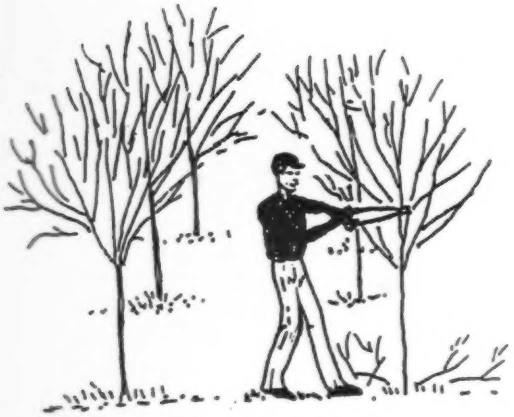
ACTIVITIES:

1. Have the students read pages 34-35 in New York's Big Apple. Then have them complete the accompanying exercise.

2. Bring a pomologist into the classroom to discuss fruit production.

3. Conduct a class discussion about the symbolic meaning of the title "Rebuild the Empire". Tie into this discussion the need to make wise use of our environment, scarcity of resources, New York's economy, New York's highway system, the need for educated people, etc.

4. Have the students create a poster with their own version of Rebuilding the Empire. It could be on stocking fish in our lakes and streams, reinstating endangered species into our state, rebuilding our highways, improving our schools, practicing soil and water conservation, rebuilding factories or introducing new industries into our state.

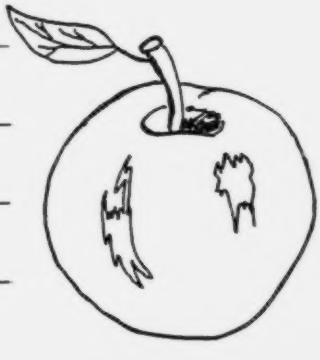


COMPOSITION - to explain

Name________________________________Date_______________

Read and observe "Rebuilding the Empire" on pages 34 and 35 of New York's Big Apple. This is a symbolic representation of how an orchard is produced. The real trees in today's orchard do not actually come from seed. Instead, a small branch of an existing tree is grafted onto a root stock to produce a tree.

DIRECTIONS: Write an essay describing, in order, the process of producing an apple to replace the apple we have all taken a bite of by reading *New York's Big Apple.*



TEACHER MATERIALS

CONCEPTS:

Composition - to describe
Reading - comprehension
- critical and interpretive reading
Language - grammar

OBJECTIVE: The student will describe the author's meaning in the quotations.

BACKGROUND: Throughout the ages, much has been written about agriculture and nature. Some quotations are given here detailing the virtues of nature, value of the farm, or life close to the earth.

ACTIVITIES:

1. Make copies of the quotations in this lesson.

2. Have the students read the quotations aloud in class. Have each one select a quote to write about.

3. Have the students write a paragraph describing one of the quotations listed in this lesson. The object is to describe what the author meant. Encourage them to explain the author's viewpoint in the quotation used. Ask them to use an example of something happening in the world today which makes this quote applicable at this date.

4. Have the students write their own "famous quotation."

Name______________________________Date_____________________

QUOTATIONS

DIRECTIONS: Read the quotations. Choose one and write a paragraph describing what its author means.

QUOTATIONS

1896 - William Jenning Bryan said:

"Burn down your cities and leave our farms and your cities will spring up again as if by magic, but destroy our farms and grass will grow in the streets of every city in the country."

* * * * * * * * * * * * * *

Philemon

"A farmer is always going to be rich next year."

* * * * * * * * * * * * * *

Henry Ward Beecher

"Flowers have an expression of countenance as much as men or animals. Some smile; some have a sad expression; some are pensive and diffident; others are plain honest and upright, like the broad-faced sunflower and the hollyhock."

* * * * * * * * * * * * * *

T. Binney

"Nature's the most thrifty thing in the world, she never wastes anything; she undergoes change, but there is no annihiliation - the essence remains."

* * * * * * * * * * * * * *

Willa Cather

"I like trees because they seem more resigned to the way they live than other things do."

* * * * * * * * * * * * * *

William D. Hoard 1836-1918

"The dairy cow is the foster mother of the human race."

* * * * * * * * * * * * *

"He who has bread may have many troubles;

He who lacks it has only one."

Old Byzantine Proverb

* * * * * * * * * * * * *

"If you desire peace,
cultivate justice,
but at the same time cultivate the
fields efficiently to produce more bread;
otherwise there will be no peace!"

Norman Borlaug
Father of the Green Revolution
1970 Recipient of the Nobel Peace
Prize

TEACHER MATERIALS

CONCEPT: Whole numbers
  - addition
  - subtraction
  - multiplication
  - division
  - word problems

Fractions
  - adding
  - multiplying
  - lowest common denominator
  - word problems

OBJECTIVES: By completing the mathematical calculations and discussing the information, students will gain an appreciation for agriculture's diversity and investment.

BACKGROUND:

1. "Today's Tractors" - Farm equipment today is very expensive. Per worker, agriculture has the largest dollar investment of any industry in the United States. This worksheet gives a realistic comparison of the cost of tractors and farm machinery.

2. "The Agricultural Dollar" - It is true that for every dollar earned by an agriculturist seven dollars circulate through the local economy to support that farm, nursery or greenhouse.

3. "Agricultural Statistics" - The majority of the people in the U.S. do not realize that agriculture is still our leading industry. Agriculture is much more than farming.

ACTIVITIES:

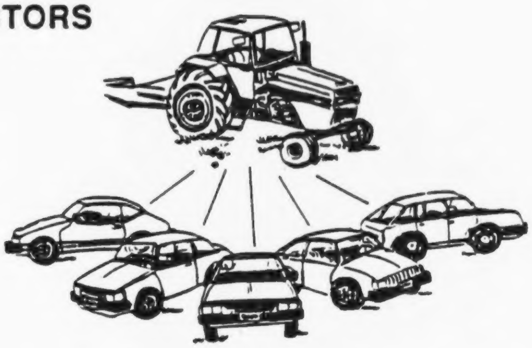
1. Have the students perform the mathematical calculations as indicated.

2. Discuss the information presented as interest in the subject warrants.

Word Problems
- multiplication
- division

Name ______________________________ Date____________

TODAY'S TRACTORS



1. An average tractor costs 5 times as much as an average American economy car. If a car costs $9,500, how much does the tractor cost?

$____________

2. How many $100 bicycles can you buy for the price of the tractor in Problem #1?

$____________

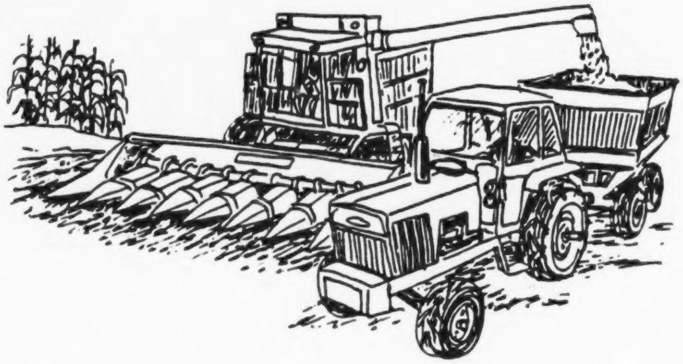
3. How many $400 TV's can you buy for the price of the tractor in Problem #1?

$____________

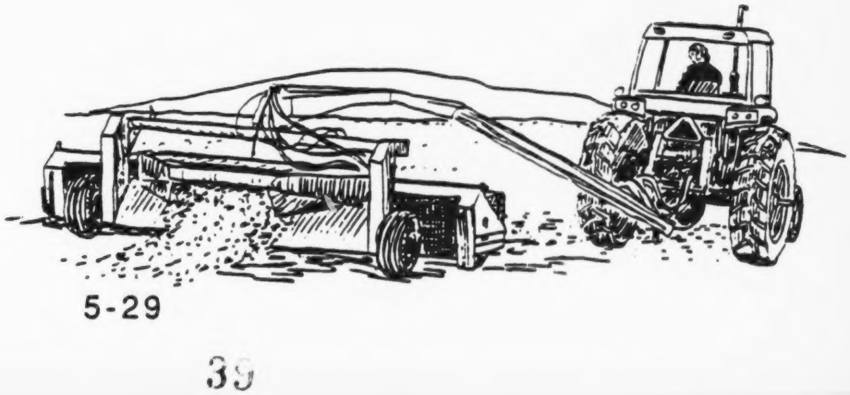
4. If Mr. Johnson pays for his tractor with 5 equal payments, what is the amount of each payment? Use the cost of the average tractor in Problem #1.

____

5. The tractor is only 1/5 of the total cost of the machinery on the Johnson's farm. What is the cost for all the machinery on the Johnson's farm?

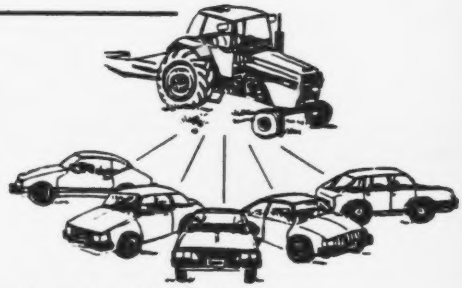


____



Word Problems
- multiplication
- division

Name ______________________ Date__________



ANSWER KEY

TODAY'S TRACTORS

1. An average tractor costs 5 times as much as an average American economy car. If a car costs $9,500, how much does the tractor cost?

$47,500

2. How many $100 bicycles can you buy for the price of the tractor in Problem #1?

475

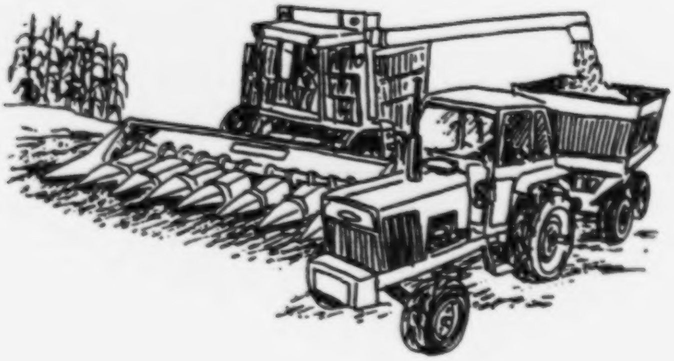
3. How many $400 TV's can you buy for the price of the tractor in Problem #1?

118

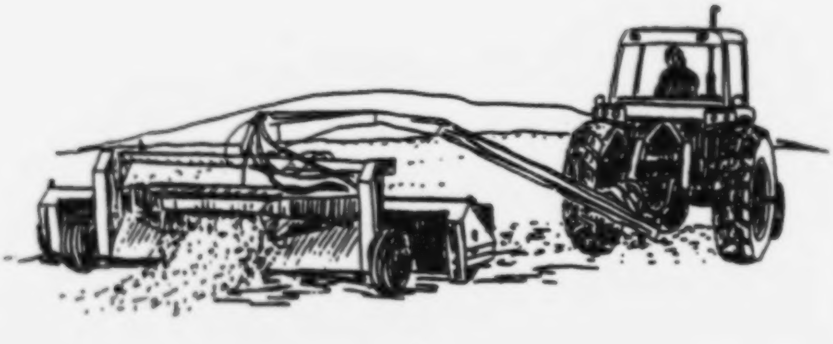
4. If Mr. Johnson pays for his tractor with 5 equal payments, what is the amount of each payment? Use the cost of the average tractor in Problem #1.

$9,500

5. The tractor is only 1/5 of the total cost of the machinery on the Johnson's farm. What is the cost for all the machinery on the Johnson's farm?



$237,500



Word Problems
- multiplication

Name ______________________________ Date______________

THE AGRICULTURAL DOLLAR

For every dollar earned by U.S. agriculturists, seven (7) dollars are generated by the purchases they make and services that their businesses need.

1. If there are 30 dairy farmers in your community and each sells $100,000 worth of milk, how much money is this?

$______________

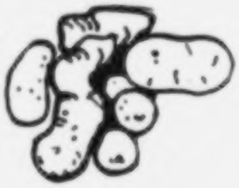
How much money is generated for the community?

$______________

2. If there are 10 farmers in your community who each sell $35,000 worth of vegetables, how much money is this?

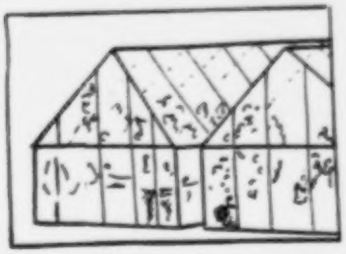
$______________

How much money is generated for the community?



$______________

3. If there are 4 greenhouse growers and each sells $160,250 worth of plants, how much do they all sell together?



$____________

How much money does this generate for the community?

$____________

4. There are 3 dog-grooming services in your community. One earns $57,000 per year, another $133,078 a year and the third earns $67,788 a year. How much did they earn together?

$____________

What amount of money will this cause to flow through the rest of the community?

$____________

Word Problems
- multiplication

Name ______________________________Date_____________

ANSWER KEY

THE AGRICULTURAL DOLLAR

For every dollar earned by U.S. agriculturists, seven (7) dollars are generated by the purchases they make and services that their businesses need.

1. If there are 30 dairy farmers in your community and each sells $100,000 worth of milk, how much money is this?

$3,000,000

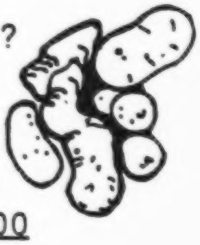
How much money is generated for the community?

$21,000,000

2. If there are 10 farmers in your community who each sell $35,000 worth of vegetables, how much money is this?

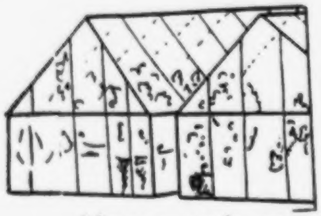
$350,000

How much money is generated for the community?



$2,450,000

3. If there are 4 greenhouse growers and each sells $160,250 worth of plants, how much do they all sell together?



$641,000

How much money does this generate for the community?

$4,487,000

4. There are three dog-grooming services in your community. One earns $57,000 per year, another $133,078 a year and the third earns $67,788 a year. How much did they earn together?

$257,866

What amount of money will this cause to flow through the rest of the community?

$1,805,062

Word Problems
- fractions
- percentages

Name ______________________________ Date________

AGRICULTURAL STATISTICS

1. About 2/3 of the people in the world are farmers. Calculate, to the nearest tenth, the percent of the world's people who produce food and fiber.

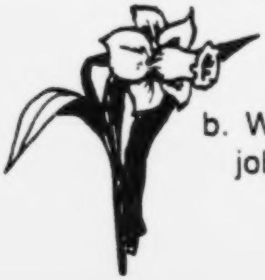
2. In the United States one out of 50 people are farmers.

   a. What fraction is this?

   b. What percent of the people in the U.S. are involved with farming?

3. One out of every 4 jobs in the United States is linked to agriculture.

   a. What fraction is this?



   b. What percent of the people in the United States have jobs that help farmers produce food for you?

4. In 1930, 100 million acres of land were planted to corn in the United States. Today, only 75 million acres of land are planted to corn.

    a. What fraction is planted to corn today versus 1930?

    b. What percent is this?

5. Today, farmers in the United States export 1 out of every 3 bushels of corn they produce.

    a. What fraction is this?

    b. What percent is this?

6. In Australia, 3/5 of the people are farmers. What percent is this?

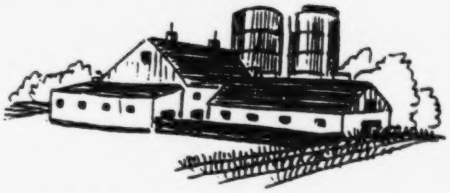
Word Problems
- fractions
- percentages

Name ______________________________ Date___________

ANSWER KEY

AGRICULTURAL STATISTICS

1. About 2/3 of the people in the world are farmers. Calculate, to the nearest tenth, the percent of the world's people who produce food and fiber.



66.6%

2. In the United States one out of 50 people are farmers.

   a. What fraction is this?

   1/50

   b. What percent of the people in the U.S. are involved with farming?

   2%

3. One out of every 4 jobs in the United States is linked to agriculture.

   a. What fraction is this?

   1/4

   b. What percent of the people in the United States have jobs that help farmers produce food for you?

   25%

4. In 1930, 100 million acres of land were planted to corn in the United States. Today, only 75 million acres of land are planted to corn.

a. What fraction is planted to corn today versus 1930?

3/4

b. What percent is this?

75%

5. Today, farmers in the United States export 1 out of every 3 bushels of corn they produce.

a. What fraction is this?

1/3

b. What percent is this?

33.3%

6. In Australia, 3/5 of the people are farmers. What percent is this?

60%

TEACHER MATERIALS

CONCEPTS: Math
- word problems
- multiplication with decimals
- multiplication with whole numbers
- whole numbers up to 100,000
- division with whole numbers

Social Studies
- interdependence
- change

OBJECTIVE: Poultry production is big business and has been influenced by advances in genetics and by economics. Chickens are becoming increasingly efficient at converting feed to meat. Modern chickens reach market weight much earlier than their ancestors and require much less feed to attain that weight. "Fowl Facts" incorporates information to illustrate these facts.

Most poultry production is dominated by major companies that own the chickens, feed, and processing plants. They contract with farmers to provide the labor, buildings, and equipment. The company pays the farmer for each pound of bird produced. "Poultry Puzzles" incorporates information about the economics of production.

ACTIVITIES:

1. Have the students complete the 2 worksheets "Fowl Facts" and "Poultry Puzzles" by performing the mathematical calculations as indicated.
2. Discuss the information as interest in the subject warrants.

Word Problems
- multiplication
- decimals

Name ______________________________ Date____________

FOWL FACTS

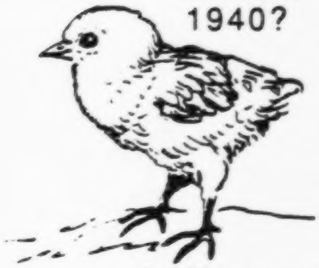
Most of the chickens eaten today are broilers. Broilers are young chickens, usually under 8 weeks of age and usually weighing about 4.5 pounds. They may also be called fryers.

Chicks grow very fast and convert feed to meat very efficiently. Today, for each pound the broiler weighs, it must eat a total of about 2 pounds of chicken feed during its life.

1. How much chicken feed does a broiler have to eat to reach a weight of 4.5 pounds?

____________lbs.

2. Chickens grow faster today than they used to because of scientific advances. In 1940, a chicken had to eat about 4 pounds of feed for each pound of body weight. How much chicken feed would a 4.5 pound broiler have to eat in 1940?



____________lbs.

3. How much more feed did a chicken have to eat in 1940 than today to reach a weight of 4.5 pounds?

____________lbs.

Fowl Facts (continued)

4. If chicken feed cost $.08 per pound today, what are the feed costs for a 4.5 lb. broiler?

$__________

5. If chicken feed cost $.02 per pound in 1940, what were the feed costs for a 4.5 lb. broiler?

$__________

6. If humans only had to eat a total of 2 lbs. of food for each pound of body weight, how much food would an 85 lb. fourth grader have eaten in his/her life?

__________lbs.

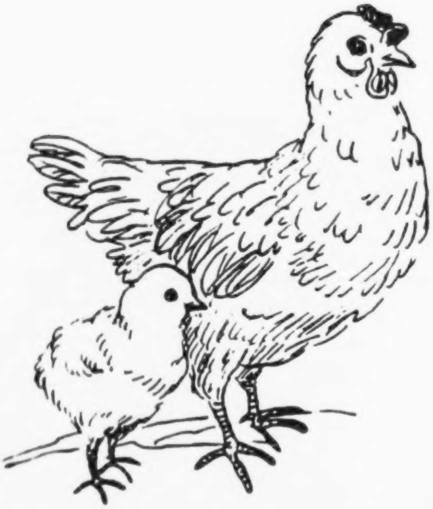
7. The average person eats 58 pounds of chicken each year. How many pounds of chicken would a 9 year old have eaten in his/her life at that rate?

__________lbs.

Fowl Facts (continued)

8. You can see that people have to eat a lot more food for each pound of body weight than chickens. Chickens grow so fast that at 6 1/2 weeks of age, broilers weigh 43.7 times their original hatching weight. If humans grew at that rate, how much would an 8 lb. newborn weigh at 6 1/2 weeks of age?

____________lbs.



Word Problems
- multiplication
- decimals

Name *ANSWER KEY* Date______________________

FOWL FACTS

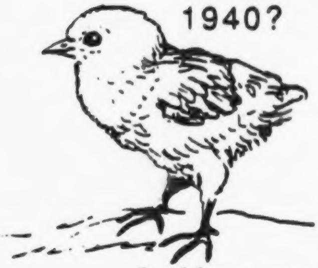
Most of the chickens eaten today are broilers. Broilers are young chickens, usually under 8 weeks of age and usually weighing about 4.5 pounds. They may also be called fryers.

Chicks grow very fast and convert feed to meat very efficiently. Today, for each pound the broiler weighs, it must eat a total of about 2 pounds of chicken feed during its life.

1. How much chicken feed does a broiler have to eat to reach a weight of 4.5 pounds?

9.0 lbs.

2. Chickens grow faster today than they used to because of scientific advances. In 1940, a chicken had to eat about 4 pounds of feed for each pound of body weight. How much chicken feed would a 4.5 pound broiler have to eat in 1940?



18.0 lbs.

3. How much more feed did a chicken have to eat in 1940 than today to reach a weight of 4.5 pounds?

9.0 lbs.

54

4. If chicken feed cost $.08 per pound today, what are the feed costs for a 4.5 lb. broiler?

$ .72

5. If chicken feed cost $.02 per pound in 1940, what were the feed costs for a 4.5 lb. broiler?

$ .36

6. If humans only had to eat a total of 2 lbs. of food for each pound of body weight, how much food would an 85 lb. fourth grader have eaten in his/her life?

170 lbs.

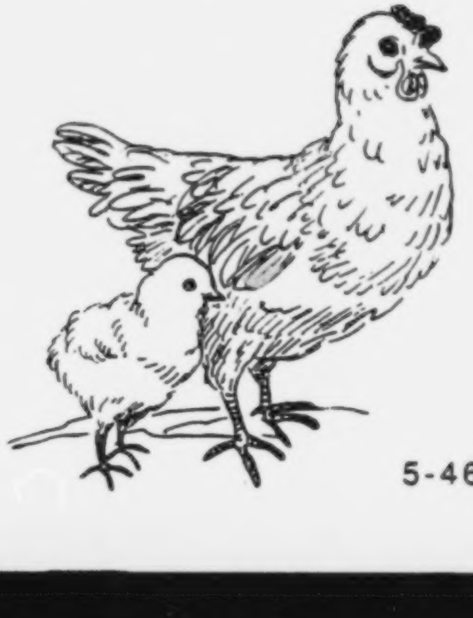
7. The average person eats 58 pounds of chicken each year. How many pounds of chicken would a 9 year old have eaten in his/her life at that rate?

522 lbs.

Fowl Facts Answer Key (continued)

8. You can see that people have to eat a lot more food for each pound of body weight than chickens. Chickens grow so fast that at $6^{1}/_{2}$ weeks of age, broilers weight 43.7 times their original hatching weight. If humans grew at that rate, how much would an 8 lb. newborn weigh at $6^{1}/_{2}$ weeks of age?

349.6 lbs.

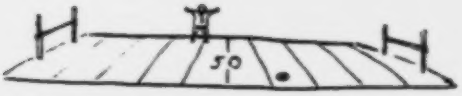


Word Problems
- multiplication
- division

Name ______________________ Date____________

POULTRY PUZZLES

1. Most chicken farmers raise large numbers of chickens in long buildings. They may raise 100,000 chickens at a time in buildings as long as a football field. A football field is 100 yards long. How long is that in feet? (3 ft. = 1 yard)



__________ft.

Often the farmer who raises chicks does not own them. They belong to a big company that signs a contract with many farmers to raise their chicks until they reach market size. The company that owns the chicks may be a feed company. The farmer raises the chicks from a few days old to about 6 1/2 weeks.

2. The large company pays the farmer a few cents per pound of chicken produced. For example, a farmer may receive 4¢ per pound for a 4 pound chicken. How much would the farmer receive for that chicken?

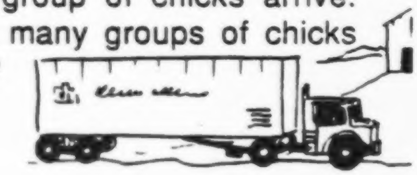
____

3. It is easy to see why the farmer must raise a lot of chickens! How much would the farmer be paid for 100,000 chickens like the one in problem #2? (Watch out for decimal point!).

____

Poultry Puzzles (continued)

4. The farmer raises each group of chickens for about 6 $^1/_2$ weeks, then the poultry house sits empty for about 2 weeks before the next group of chicks arrives. The farmer sterilizes the house before the next group of chicks arrive. There are 52 weeks in a year. How many groups of chicks would this farmer raise in one year?



____

5. If the farmer raises 100,000 chickens in each group, how many chickens will he raise in a year? (Use your answer from #4 to answer this question.)

____

Farmers have a lot of expenses to pay. They have to pay for buildings, equipment, fuel, repairs, and other things. Income is the amount of money paid to the farmers for their product. Profit is the amount of money the farmer has left after paying for expenses.

6. How much income would be produced in one year if the farmer is paid $10,000 for each of 5 groups of chickens?

____

7. If the farmer in problem #6 has expenses of $35,000 per year, how much would profit be for the year?

____

Word Problems
- multiplication
- division

Name ______________________ Date____________

ANSWER KEY

POULTRY PUZZLES

1. Most chicken farmers raise large numbers of chickens in long buildings. They may raise 100,000 chickens at a time in buildings as long as a football field. A football field is 100 yards long. How long is that in feet? (3 ft. = 1 yard)

300 ft.

Often the farmer who raises chicks does not own them. They belong to a big company that signs a contract with many farmers to raise their chicks until they reach market size. The company that owns the chicks may be a feed company. The farmer raises the chicks from a few days old to about 6 $^1/_2$ weeks.

2. The large company pays the farmer a few cents per pound of chicken produced. For example, a farmer may receive 4¢ per pound for a 4 pound chicken. How much would the farmer receive for that chicken?

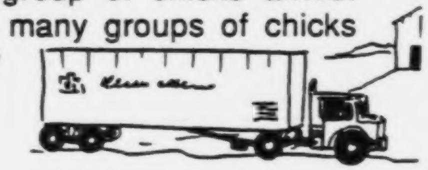
16 ¢

3. It is easy to see why the farmer must raise a lot of chickens! How much would the farmer be paid for 100,000 chickens like the one in problem #2? (Watch out for decimal point!).

$ 16,000

Poultry Puzzles (continued)

4. The farmer raises each group of chickens for about 6 $^1/_2$ weeks, then the poultry house sits empty for about 2 weeks before the next group of chicks arrives. The farmer sterilizes the house before the next group of chicks arrive. There are 52 weeks in a year. How many groups of chicks would this farmer raise in one year?



6.1

5. If the farmer raises 100,000 chickens in each group, how many chickens will he raise in a year? (Use your answer to #4 to answer this question.)

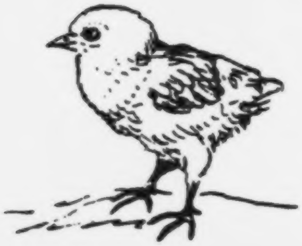
610,000

Farmers have a lot of expenses to pay. They have to pay for buildings, equipment, fuel, repairs, and other things. Income is the amount of money paid to the farmers for their product. Profit is the amount of money the farmer has left after paying for expenses.

6. How much income would be produced in one year if the farmer is paid $10,000 for each of 5 groups of chickens?

$ 50,000

7. If the farmer in problem #6 has expenses of $35,000 per year, how much would profit be for the year?



$ 15,000

Life Science - III A - 2.1,
2.2, 2.3, 2.4

TEACHER MATERIALS

CONCEPTS: Life Science III A - 2.1, 2.2, 2.3, 2.4
III B - 1, 2.2
Plant and animal life is affected by environmental conditions.

OBJECTIVES: The student will become conscious of the materials, plants and animals of the earth which provide for life.

The students will recognize the need to use the materials of the earth wisely.

BACKGROUND: This lesson is designed to draw upon the students' knowledge of the basic needs of plants and animals, and to develop an appreciation for the earth and for the importance of the wise use of the earth and its resources. Specific conservation techniques are not mentioned in this lesson. However, this lesson would be a good introduction to a unit or lesson on conservation.

If you have previously done a unit about the moon with your class, you may wish to incorporate some of the facts from the previous lessons into the current lesson, comparing conditions on the earth to conditions on the moon.

ACTIVITIES:

1. Have the students read and discuss the story "A Trip to the Moon", as a class activity.

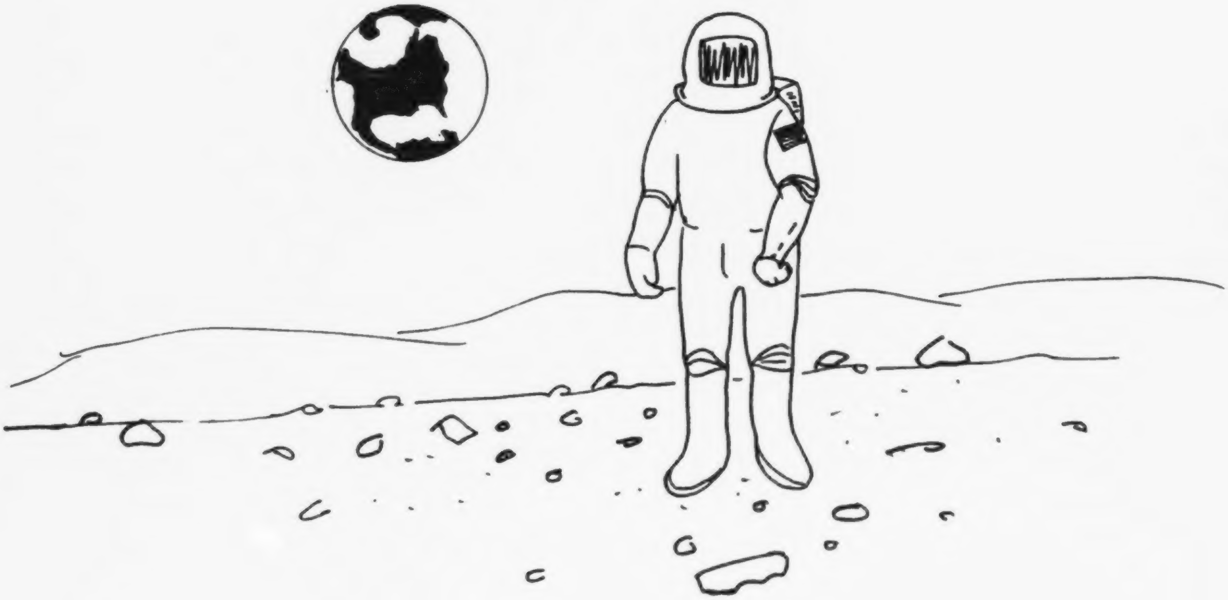
2. Ask the students "What do we need to survive?". Have the students make a list of everything they do during the day (choose a specific day, like today or tomorrow) to make

them aware of the things they tend to take for granted. When the lists are completed, look at them from the perspective of the trip to the moon to see how many items on the list would be different, or impossible, if we were on the moon.

3. Have the students complete the food diary to appreciate how great their needs are.

4. Using the story, "A Trip to the Moon" or the lists generated in Activity 2, have the students perform skits to depict the predicaments faced in trying to satisfy basic needs on the moon.

5. Make use of the 4-H program "Blue Sky Under My Feet." Contact your local Cornell Cooperative Extension office for information.

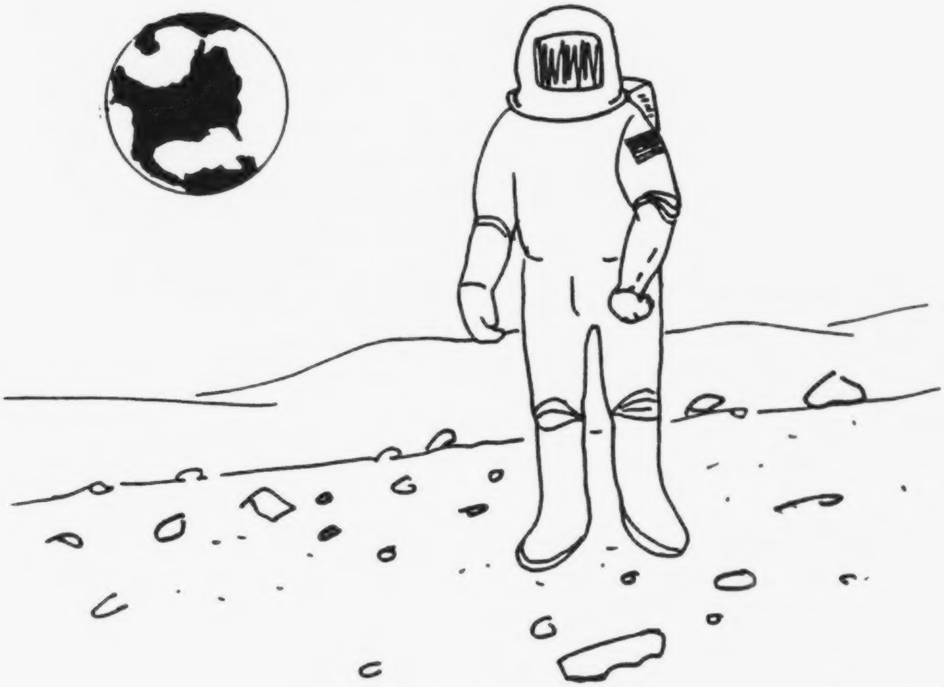


A TRIP TO THE MOON

The earth is rich with many, many different kinds of plants and animals. Some kinds prefer hot, dry climates, some grow better in cool, humid climates, and many others prefer something in-between. All plants and animals have some of the same needs and our earth provides for these needs.

There are no plants or animals living on the moon! Do you know why? It is because the moon does not provide for the basic needs of plants and animals.

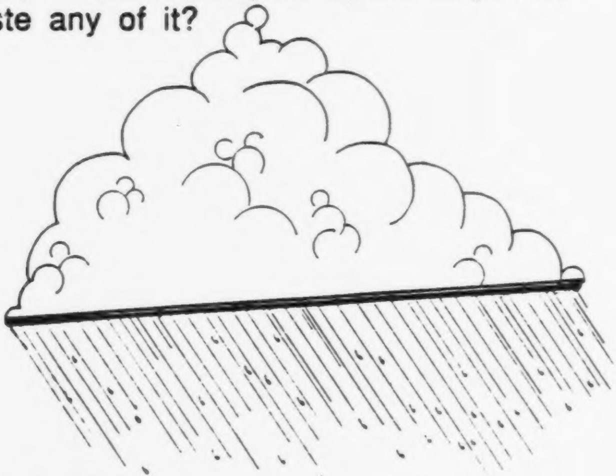
- The moon has no air.
- The moon has no water.
- The moon has no atmosphere to help control temperature.
- The sunny side of the moon gets up to 200° F. (99° C).
- The side away from the sun gets as low as 460° F below zero (-273°C)!



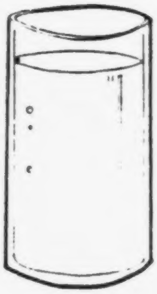
]

Sometimes people forget to appreciate all the good things we have on earth. If you pretend that you are trying to live on the moon for a day, it will help you to remember the good things we have on earth.

Try this experiment today. Pretend you are on the moon. Every time you use water for drinking or washing, remember that you had to bring every drop of it in your space ship. Do you think you would waste any of it?



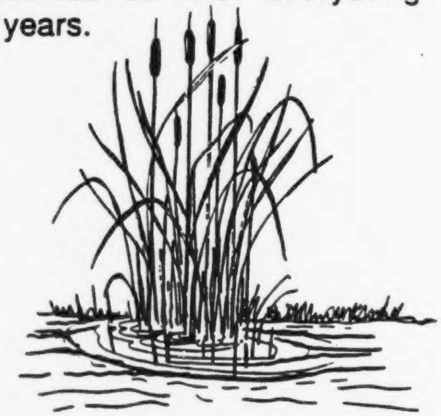
Think about your breathing for a few minutes. Remember that every breath of air has been brought from the earth in air tanks. You can't go anywhere without your air supply, and you keep looking at the gauge to see how much air is left.



Every time you eat, remember that every bit of food was grown on the earth and shipped to the moon, 375,000 kilometers away.

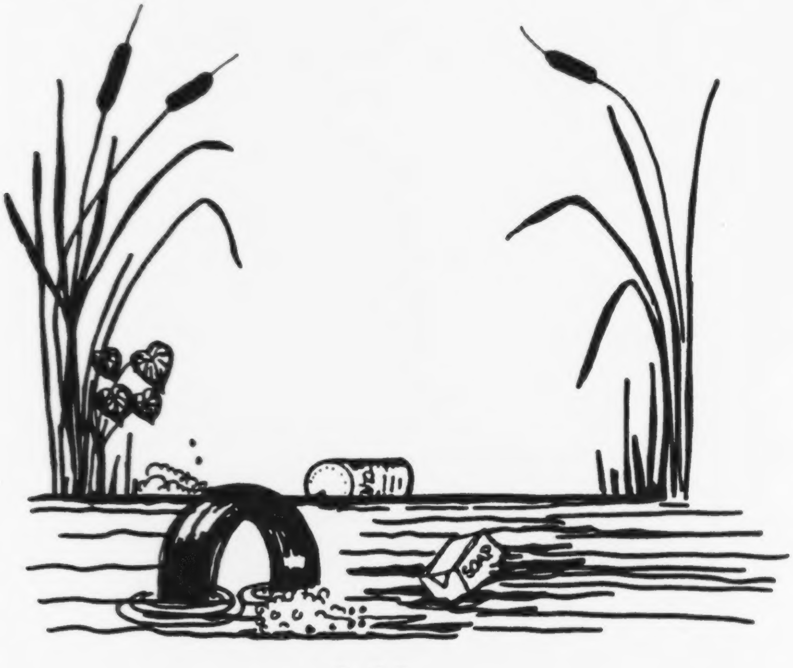
If you stay on the moon for awhile, you will run out of air, water, and food and you can't get anymore unless you go back to earth. If you know that will happen, you will take very good care of your air, water, and food. You won't want to waste even a tiny bit!

Look at the lakes and rivers, and even water falling out of the sky! Look at the crops and farm animals being raised to provide you with food. All around us are the things we need for life, but usually we don't think about them. If we take good care of our earth, it will provide us with everything we need for years, and years, and years.



Sometimes we don't remember how lucky we are to have such a rich earth that provides us with all our needs. We pollute the air and the water and let our farm lands erode or be covered with concrete.

Conservationists are people who show us how to take good care of the earth and all that the earth provides. And sometimes, when people forget to appreciate all that we have on earth, they may need to take another imaginary trip to the moon!



Name ______________________ Date ________________

FOOD DIARY

Directions: Keep this Food Diary by filling in everything you eat in a 24 hour period. Cross off each drink you take.

Breakfast: ______________________________

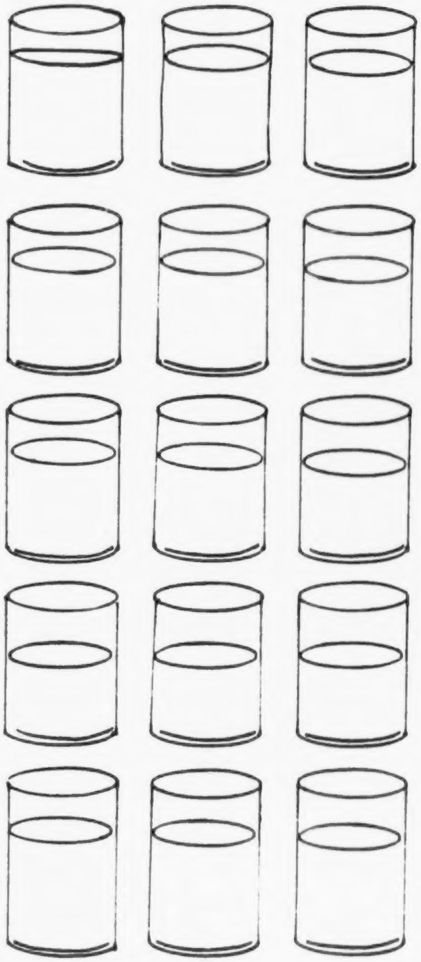
____

____

____

____

Glasses of water or other drinks:



Lunch: ______________________________

____

____

____

____

Dinner: ______________________________

____

____

____

____

Snacks: ______________________________

____

____

____

TEACHER MATERIALS

CONCEPT: Life Science III A - 2 The life of an animal is affected by the environmental conditions.

OBJECTIVES:

1. The students will group animals raised commercially according to their scientific classification.
2. The students will acquire an increased awareness of the variety of animals raised in agriculture and aquaculture.

BACKGROUND: Many people do not realize that agriculture includes the raising of a great variety of animals which are not typically considered "farm animals". This lesson is designed to demonstrate that, while giving the students practice classifying animals.

This lesson is designed to be used in conjunction with your science text or other materials which teach the classification of animals.

ACTIVITY: Worksheet on classifying animals.

Name ______________________ Date ____________________

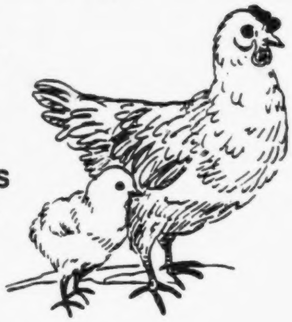
Many different kinds of animals are raised to be sold for food, for their fur or skin, or for recreation. Raising animals is part of agriculture. The word for raising fish is "aquaculture".

The following animals are all raised on various types of farms. Some are mammals, some are birds, some are fish, and one is an amphibian. Write the name of each animal under the proper heading.

pigs
chickens
frogs
trout
goats

sheep
salmon
turkeys
minnows
cows

geese
mink
dogs
horses
ducks



MAMMALS

____
____
____
____
____
____
____

BIRDS

____
____
____
____
____
____
____

FISH

____
____
____

AMPHIBIANS

____
____
____

Name ___*ANSWER KEY*_____ Date ____________________

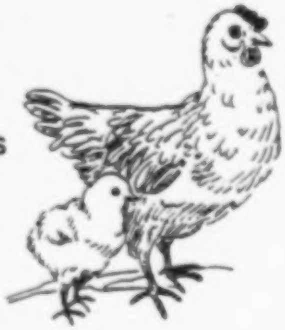
Many different kinds of animals are raised to be sold for food, for their fur or skin, or for recreation. Raising animals is part of agriculture. The word for raising fish is "aquaculture".

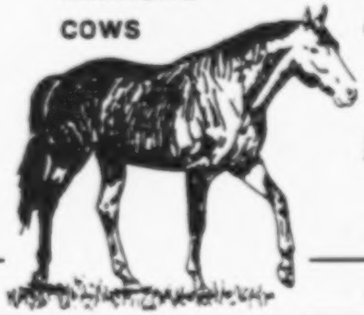
The following animals are all raised on various types of farms. Some are mammals, some are birds, some are fish, and one is an amphibian. Write the name of each animal under the proper heading.

pigs
chickens
frogs
trout
goats

sheep
salmon
turkeys
minnows
cows

geese
mink
dogs
horses
ducks





Mammals

____ PIGS__________

____GOATS__________

____SHEEP__________

____COWS__________

____DOGS__________

___HORSES__________

____MINK__________

Birds

___CHICKENS_______

___TURKEYS_________

______GEESE_________

______DUCKS________

____

____

____

Fish

_____TROUT________

____SALMON________

____MINNOWS________

____

Amphibians

_____FROGS_______

____

____

____

6[illegible]

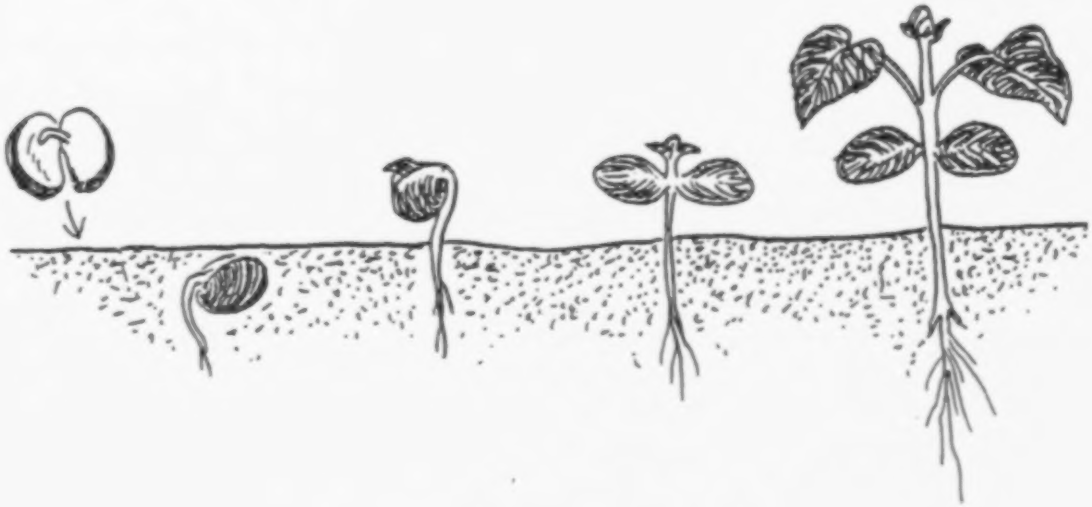
TEACHER MATERIALS

Instructions for the teacher:

"Growing a Green Thumb" is designed for those who know little or nothing about growing plants. If you fall into this category read on; if not, simply use the plant-growing exercises for the students.

Introduction:

It would seem that some people have a green thumb and others kill every plant they have ever owned. The difference is not some wonderful personality trait, but rather knowledge. Instead of providing mountains of information on the care and feeding of each plant you could come in contact with in a lifetime, this offers a simple, common-sense approach to growing plants. It does not provide the exact care of individual plants, but gives general ideas that will help you understand the basic care of any 'type' of plant.



Life Science - II A-
1.1, 1.2, 1.3, 1.4, 1.5

GROWING A GREEN THUMB

Plants alone produce food. The rest of us simply convert plant and animal food into fuel for our own bodies. A plant takes energy from the sun, combines the nutrients and water from the soil and produces the carbohydrates and proteins that we think of as food and fiber. When growing plants, it is important to keep that in mind.

A plant needs sunlight, water, nutrients, adequate temperature and air. If deprived of any one of these, it will not be able to sustain itself. Whenever possible, use common sense in growing plants.

Light

All plants need sunlight. However, different plants have adapted to different amounts of light. That is why some plants make excellent houseplants, some plants can get sunburned and some require full light. A good rule of thumb is to consider where a plant originated and its growth pattern to estimate the amount of sun it needs. For example: a tropical tree which would have its top below the jungle canopy will need diffused or low intensity sunlight. A plant that grows on a prairie, desert, or open meadow will need bright, direct sunlight. It is also a good rule of thumb to realize that any sudden changes in the amount of sunlight a plant receives will have an impact on the plant.

Artificial light is better than none. The major problem with artificial light is that the light does not contain the full spectrum of wavelengths that most plants need. If only artificial light is available, both incandescent and fluorescent light should be used. "Grow" lights can provide the full spectrum for plants.

Water and Air

All plants need water. Here again the amount of water a plant needs depends upon the adaptations a plant has made. A desert plant, having adapted to its environment, needs little water.

All plants need air, both above and below the ground. The one fact that people are not generally aware of is that a plant's roots need equal amounts of water and air. If the soil becomes water logged, the plant will literally drown. Again, the amount of air needed will depend upon the adjustments a plant has made to its environment. Cattails can thrive in standing water while a cactus would rot. Most mistakes in caring for houseplants are made because people water incorrectly. By doing so, one alters the amount of air pockets in the soil.

Water plants consistently! Once or twice a week may be sufficient for tropical plants. If the soil feels cool to the touch, the soil is moist enough. If the plant wilts, you've waited too long and it will be damaged. Don't overwater, especially if you've let the plant dry out!

A plant produces more oxygen than it needs during photosynthesis. But, when a plant is in the dark (at night) it respires much as an animal would.

Temperature

The temperature which a plant needs to thrive varies with the plant. Again, think of where the plant originated. A tropical plant will not be able to withstand a freeze. The exact temperature for each plant can become complex. However, room temperature above 60°F is generally adequate for most houseplants. Germination of seeds usually requires at least a 70°F soil temperature.

Nutrients

Plants usually obtain nutrients through their roots from the soil (there are exceptions). The three major nutrients a plant needs are nitrogen, phosphorus and potassium, known by their chemical symbols N-P-K. When one purchases a 'plant food' or fertilizer, a ratio will be found on the package. This ratio tells what percent of those nutrients is in that container. A 10-10-10 ratio means that 10% of the material in the package is a nitrogen compound, 10% is a phosphorus compound, and 10% is a potassium compound. There may also be some "micro-nutrients", a carrier, surfactant, and other inert ingredients used to provide easy distribution of the nutrients. The fertilizer ratio is always given by N-P-K so a 15-5-10 would be 15%N, 5%P and 10%K. As a beginner, try to find an even ratio 10-10-10, 5-5-5, or 20-20-20 to fertilize with. Plants do have varying nutritional requirements as do people, but that is a more advanced lesson.

Schedule feedings on a monthly basis, following the package requirements. Do not fertilize your plants in late autumn or winter. The plant isn't getting much light so it will not be growing as actively.

Begin monthly feedings in early spring (late March) as day length increases.

Selecting Plants

Common houseplants have been selected as houseplants because they can take some neglect, lower intensity light and lower humidity. If you are a beginner, start with common houseplants, not exotic, difficult-to-grow ferns. Good starter plants are philodendron, golden pothos, spider plants, swedish ivy, and sansevieria. Build your confidence and commitment to being a horticulturist with a plant that can adapt.

Outdoors in a garden the same is true. Tomatoes, zucchini, zinnias, marigolds and beans are good starters. Work your way up to herbs and hybrid roses.

Good luck! These tips should prove helpful. Just remember, plants are living things which require care!

PLANT
FOO
NPK

TEACHER MATERIALS

HOW LIGHT AFFECTS PLANT GROWTH

CONCEPTS: Life Science - III A - 1.1, 1.22, 1.3

OBJECTIVES:

1. Students will plant seeds in light and dark to see the effect it has on plant growth.

2. Students will scientifically record results and make a final comparison and analysis of their results.

3. The students will understand that seeds have certain needs which must be met in order for them to grow.

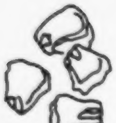
4. The students will understand that plants need light in order to grow.

MATERIALS:

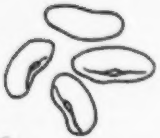
1. Bottom half of a milk carton, egg carton, styrofoam cups or pots for growing seeds for each student in class.

2. 2-3 lbs potting soil. Potting soil can be obtained from local Agway, Farm and Garden Shop, or most department stores.

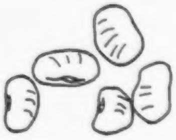
3. Water.



Corn



String Beans



Lima Beans

4. Seeds (1-2 per student). Stringbeans, corn, or lima beans are good choices.
5. Copy of the worksheet for each student for experiment recordkeeping.
6. Masking tape and markers.
7. Rulers for measuring plant growth.

Ruler
1 2 3 4 5 6 7 8 9 10 11

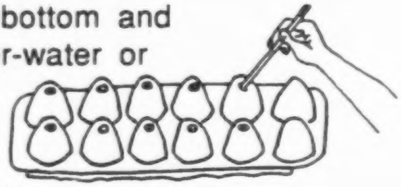
BACKGROUND: The class is going to do an experiment to see how light and dark affect plant growth. Discuss with the class some of the things that plants need to grow:

- light
- water
- warmth
- soil

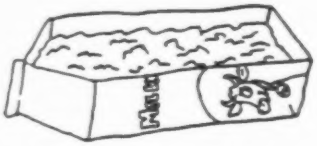
Tell the students that class is going to do an experiment to prove if plants really need some of these things to survive.

ACTIVITIES:

1. Show children how to punch holes in bottom of planting container (you may want to do this beforehand if not using a pot). Ask them why you want to punch holes in these pots? (So that excess water will drip out of the bottom and not remain in pot and over-water or drown plant roots.)



2. Show students how to fill a container with potting soil, plant their 2 seeds several inches apart and cover them with soil.



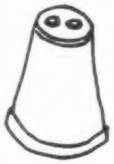
3. After the seeds are planted, the students must water them until soil is moist.

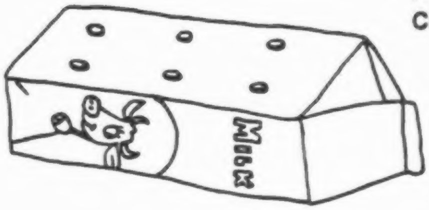
4. Tell class that each of them will plant two seeds. One half of the group's plantings will go on the window sill or some other light place, and the other half will go into a dark place like the closet or cupboard. At the end of 3 to 4 weeks, a comparsion of all growth will be made to see if plants do indeed need light to grow.

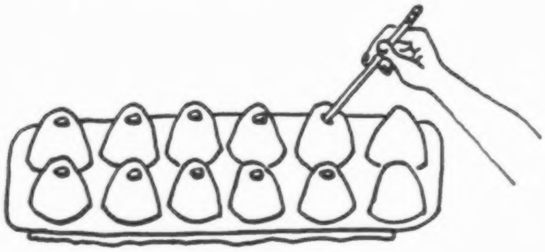
5. Divide class up into groups of 6 students.

6. Give each student: 2 seeds, a planting container, and a cup of soil to plant his/her seeds in.

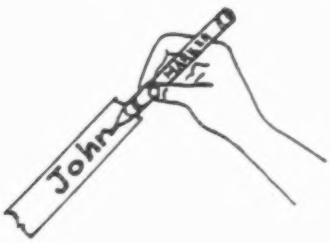
7. Ask the class to carefully follow your example. If holes have not already been punched in containers, have students carefully make holes now.

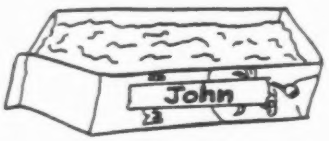


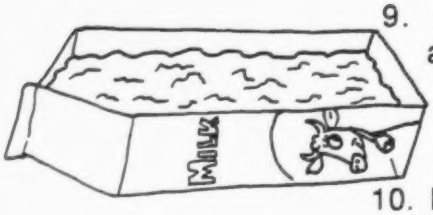




8. Tell each child to put his or her name on the container by writing it on masking tape and sticking it to container.







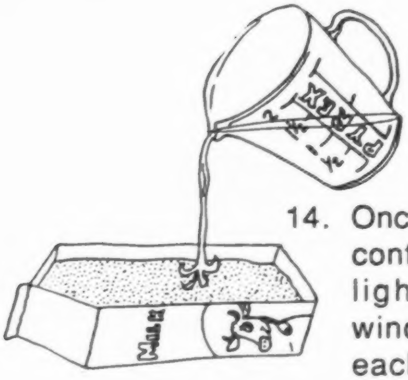
9. Instruct the class to fill their pot almost to the top with their soil.

10. Now place the seeds in the soil, several inches apart, as was demonstrated.

11. Cover seeds with remaining soil.

12. Record the date of planting and type of seed planted on the worksheet.

13. Give the seeds some water until soil is moist.



14. Once all of the seeds are planted, 3 containers from each group go into a light place (preferably on a windowsill) and 3 containers from each group go into a dark place (a closet or cupboard).

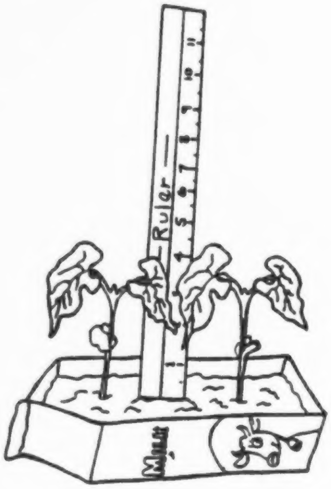
15. Students should record date of first growth appearance on their worksheet.

16. Container/plant should be watered about every three days.

17. Once plant begins growing, height should be measured and recorded weekly. Whole class should record their data on the same day.

18. After 3-4 weeks, when all seedlings are growing, a comparison between the height of plants in light and dark should be made and recorded on a chart. For example:

	LIGHT	**DARK**
	2.3"	3.3"
	2.0	3.3
	7.3	3.4
	1.7	3.5
	2.0	3.5
	7.3	3.4
	3.5	3.6
	2.3	3.2
	3.1	2.8
	2.3	3.2
Average	______	______



Tallest plant average is in ________ (light or dark) and is _____ inches high.

19. Which plants grew tallest? (light or dark?)

20. Another discussion of factors affecting plant growth should be made asking students:

- Why do you think the results occurred as they did? (Plants need light to grow. Initially, they will grow tall in search of light, but eventually will grow spindly.)
- How does a plant's needs affect farmers or greenhouse growers? (Farmers need to be sure that their crops are planted in light areas with not too much shade to insure good growth.)

- Some greenhouse crops require low levels of light. When would it be good to have long stems on plants? (Long stemmed roses, carnations, mums for florist use.)

21. From this experiment, what are some factors that you think are important for plant growth? (light, water, soil)

22. Once comparisons and discussions have been finalized, students should take the healthy plants home and transplant them into pots or a garden.

HOW LIGHT AFFECTS PLANT GROWTH

Name ______________________________ Date ______

Experiment Information:

1. Type of seeds used: ____________________________

   Number of seeds used: __________________________

   Did your seeds go into the light or dark for growing?

   ____

2. Date plant first appeared: ______________________

   How many days after planting is this? ____________

3. Once the plant appears, begin measuring it once per week to see how tall it is.

   DATE: HEIGHT:

____

____

____

____

____

____

4. After one month, how tall is your plant?

____________________ inches tall

5. Which plants grew tallest in the class, light or dark?

____

6. Why do you think this is so? ________________________________

____

____

7. From this experiment, list 3 things plants need to grow.

____

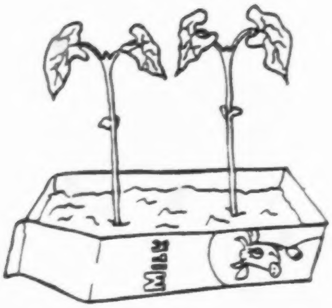
____

____

8. What do you think would happen if the plants were kept in the dark for another month? ________________________________

____

____



**Life Science III A -
1.1, 1.22, 1.3**

TEACHER MATERIALS

HOW SOIL AFFECTS PLANT GROWTH

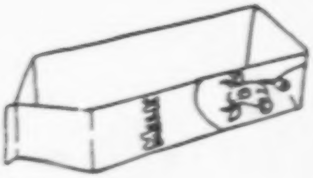
CONCEPTS: Life Science III A - 1.1, 1.22, 1.3

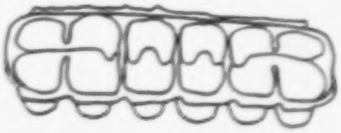
OBJECTIVES:

1. Students will plant seeds in several different media to see the effects they have on plant growth.
2. Students will scientifically record results and make a final comparison and analysis of their results.
3. Students will discuss how the type of soil could affect a farmer's crop - during dry weather or wet weather.

MATERIALS:

1. Bottom half of milk carton, egg cartons, styrofoam cups or pots for growing seeds for each student.





2. 1-2 lbs sand, 1-2 lbs clay soil, 1-2 lbs potting soil. Sand and potting soil can be obtained from local Agway, Farm Co-ops, or Farm and Garden Shop. Clay can be obtained from the art teacher, supply catalogs or dug from the soil surrounding school.

Potting
Soil

2
1½
1
½
PYREX

3. Measuring cup

4. Water

5. Seeds (2 per student pair). Stringbeans, corn, or lima beans are good choices.

6. Copy of worksheet for each student for experiment recordkeeping.

7. Masking tape and markers.

8. Rulers for measuring plant growth.

BACKGROUND: The class is going to do an experiment to compare three different types of soils (sand, clay and potting soil) and determine how each affects plant growth.

Discuss with class some of the things that plants need to grow:

- light
- water
- warmth
- soil

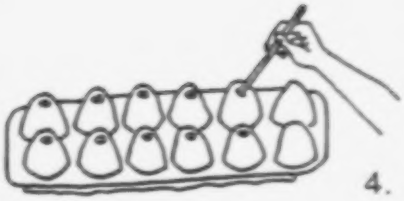
Tell students that class is going to do an experiment to prove if plants really need some of these things to survive.

ACTIVITIES:

1. Divide class up into groups of 6 students (3 pair of 2 students).

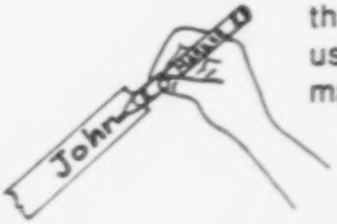
2. Give each pair of students: 2 seeds, 2 planting containers and 1 medium to plant their seeds in. (Distribute an equal number of sand, soil and clay media.)

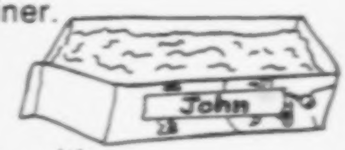
3. Show children how to punch holes in bottom of planting container (if not using a pot- you may want to do this before hand). Ask them why you want to punch holes in these pots? (so that excess water will drip out of the bottom and not remain in pot and over-water/drown plant roots)



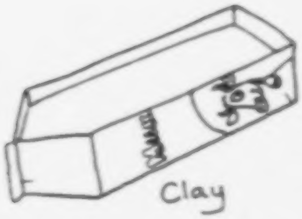
4. Have the students carefully make holes now.

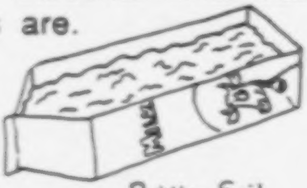
5. Tell each child to put his or her name on the container and which medium they're using (sand, soil, or clay) by writing on masking tape and sticking it to container.

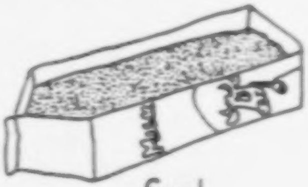




6. Fill 3 containers: 1 with sand, 1 with potting soil and 1 with clay soil. Show and tell students what each of the 3 different soils are.


Clay


Potting Soil


Sand

7. Ask students what will happen if you pour water into each of the pots? Which do they think will hold the most water? (clay) Which do they think will lose the most water? (sand)

8. Pour 1-2 cups of water (record amount) into one of the containers (depending on the size of the container you're using). Select a student to come up and measure the amount of water that comes out of the container. Repeat this step for each of the containers and record the results on the worksheet in the section provided.

9. Ask the class if their predictions were correct.

10. Ask students how this would have an effect on plant growth? Suppose there was a plant in each of these containers?

    - Sand: much water passes through it. Therefore, water is not held in soil for plant use.
    - Clay: little passes through it. Therefore, it may hold too much water and kill plant.
    - Potting soil: in between sand and clay. Therefore, not too much and not too little water is held in soil. There is usually enough water held in the soil for plant use.

11. To further this discussion, ask students why little grows on a desert? Or on a beach? (Because the soil is sand the water is not held in it. Plants need water to grow and so only specialized plants, like cactus, grow on the desert.)

12. Instruct the class to fill their pot almost to the top with their soil, sand or clay.

13. Now place the seed in the soil.

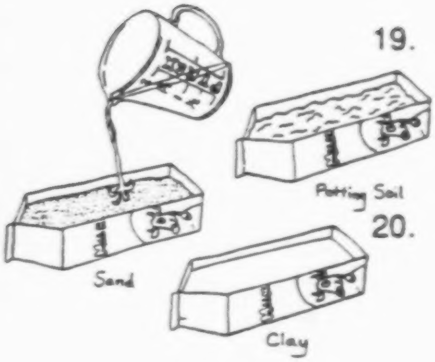
14. Cover seeds with remaining soil.

15. Record the date of planting and type of seed planted on the worksheet.

16. Give the seeds about 1/8 - 1/4 cup of water (measure exact amount).

17. Once all of the seeds are planted, they should go into a well lit place (preferably on a window sill).

18. Students should record date of first growth appearance on their worksheet.



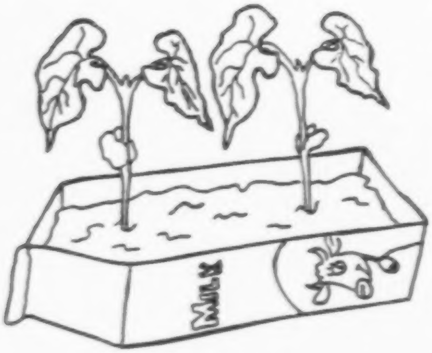
19. Container/plant should be watered 1/8 - 1/4 cup about every three days. All pots should be watered same amount, and the same number of times.

20. Once plant begins growing, height should be measured and recorded weekly. Whole class should record their data on the same day.

FOLLOW-UP DISCUSSION

At the end of 3-4 weeks, when plants have been growing and measured, the following activities can be carried out:

1. A comparison between the height of plants in each of the media should be made and recorded on a chart. For example:



SAND	SOIL	CLAY
0.3"	3.3"	2.0
3.5	2.3	3.2
1.3	3.4	1.7
1.5	3.1	1.8
2.3"	7.3"	2.0
1.5	2.3	0.2
2.3	3.4	1.7
2.5	3.1	1.8

Average _____ _____ _____

Tallest plant average is in __________ soil and is _____ inches high.

2. Which plants grew tallest? Which plants grew least?

3. Another discussion of factors affecting plant growth should be made asking students:

   - Why do you think the results occurred as they did? (Soil is the best medium. Clay holds too much water. Seeds may become water-logged. Sand does not hold enough water, seed dries out or growing plant does not get enough water.)

   - How does a plant's needs affect farmers?
     a. Out west in dry regions? (They must irrigate to provide enough water to plants.)

   - b. With soil that has a lot of clay? (They must insure that their plants don't get too much water. They're crop may not be very good.)

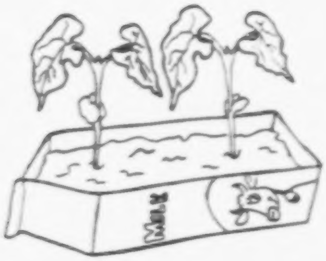
   - c. Like sand? (Their crop may not be very good as their plants will need much water to survive since the water is not held in the soil.)

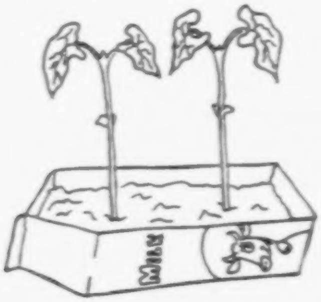
4. How could the soil type affect a golf course? A park? The building of a pond?
   A garden?

5. From this experiment, what are some factors that you think are important for plant growth?

   - soil, sun, water, warmth

6. Once comparisons and discussions have been finalized, students should take healthy plants home and transplant them into pots or gardens.





HOW SOIL AFFECTS PLANT GROWTH WORKSHEET

NAME:________________________Date: _______________

Teacher Demonstration:

List the amount of water used in your teacher's demonstration. Be sure to write in whether it's in cups, liters, ounces, etc.

Amount poured into sand: ____________________________

Amount came out of sand: ____________________________

Total amount remained in sand: _______________________

Amount poured into clay: ____________________________

Total amount remained in clay: _______________________

Amount poured into potting soil: _____________________

Amount came out of of potting soil:____________________

How do you think the type of soil affects plant growth?

____

____

____

Experiment Information

1. Type of seeds used;_____________________________

   Type of soil used (clay, sand, or potting soil):_______

   Amount of water given after planting seed:_________

2. Date plant first appeared: ______________________

   How many days after planting is this? ____________

3. Once the plant appears, begin measuring it once a week to see how tall it is.

   DATE: HEIGHT:

   ____

   ____

   ____

   ____

4. After 4 weeks, how tall is your plant? ___________

5. Which plants grew tallest in the class, Sand, Soil or

   Clay? ______________________________________

6. Which plants grew least in the class, Sand, Soil or

   Clay? ______________________________________

7. Why do you think the results occured as they did?

   ____

   ____

8. From this experiment, list 3 things plants need to grow.

   ____

   ____

   ____

III A - 1.22 PLANT STRUCTURE

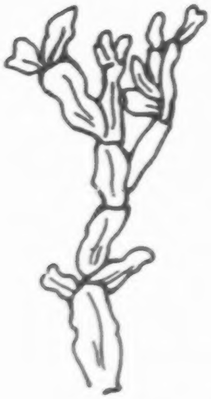
CONCEPT: Life Science III A - 1.22

The formation of particular plant structures is influenced by changing conditions of light, moisture and temperature.

MATERIALS NEEDED:

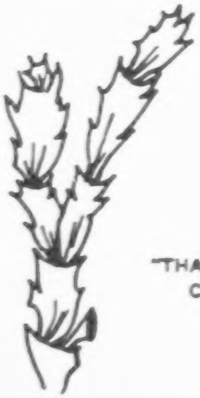
- Plants: Poinsettia
  "Christmas cactus"
  Chrysanthemum (mum)
- Black cloth

BACKGROUND: Plants are affected by changes in their environment. The horticulture industry makes use of this information in many ways. One example is to control the formation of blossoms on certain plants. The three plants listed above are influenced by decreasing day length. This plant response to day length is known as photoperiodism. Other plants are influenced by increasing day length. In nature, the decreasing (or increasing) day length signals the plant to produce flowers and set seed. Commercially, greenhouses control day length to cause plants to bloom out of season or earlier than normal to meet seasonal markets. There isn't much need for "Christmas" cactus or poinsettias after the Christmas season is over. These plants are also influenced by temperature and moisture.


"CHRISTMAS CACTUS"

ACTIVITIES: 1. "Christmas" cactus - the Christmas cactus flowers in response to cooler temperatures, shorter day length and dryer soil conditions.

a. Place a Christmas cactus in a sunny location.


"THANKSGIVING CACTUS"

    b. For Christmas bloom, begin to decrease the day length on September 15. Cover the plant with black cloth near the end of the day (say 2:20). Uncover the plant in the morning after 8 a.m.

    c. Keep the plant somewhat drier than normal, but not wilting.

    d. Keep cooler night temperatures - near 55° F best.

    e. Blooming occurs 2 1/2 - 3 months after the start of short days.

    f. If one day of covering the plant is missed, it will disturb the photo period and you must begin again.

    g. Keep the plant covered on weekends (or in a closet, if you are not planning to visit the classroom on weekends).

2. Poinsettias - the poinsettia also responds to shorter day length and lower temperatures. Moisture levels in the soil have little impact on flower production.

    a. Follow the procedures of 1A through 1G.

    b. Lower temperatures are crucial for colorful poinsettias. If the temperature isn't lowered, the plant will still "bloom", but the bracts (flower petals) will not be brightly colored.

3. Chrysanthemum - mums respond to shortened days. This plant sets buds when the day length is 13 1/2 hours or less.

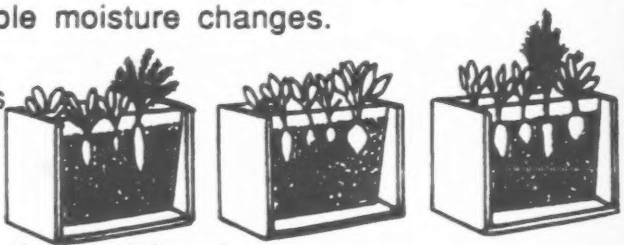
   a. Follow the directions for 1A - 1G. (Mums need bright sunlight. It may be a good idea to supplement the available light of the classroom.)

   b. Any time of year is satisfactory for this experiment.

CONCEPTS: Life Science III A - 1.21

The growth rate of roots of some green plants changes as available moisture changes.

MATERIALS:



Seeds - lima beans
- corn
- peas

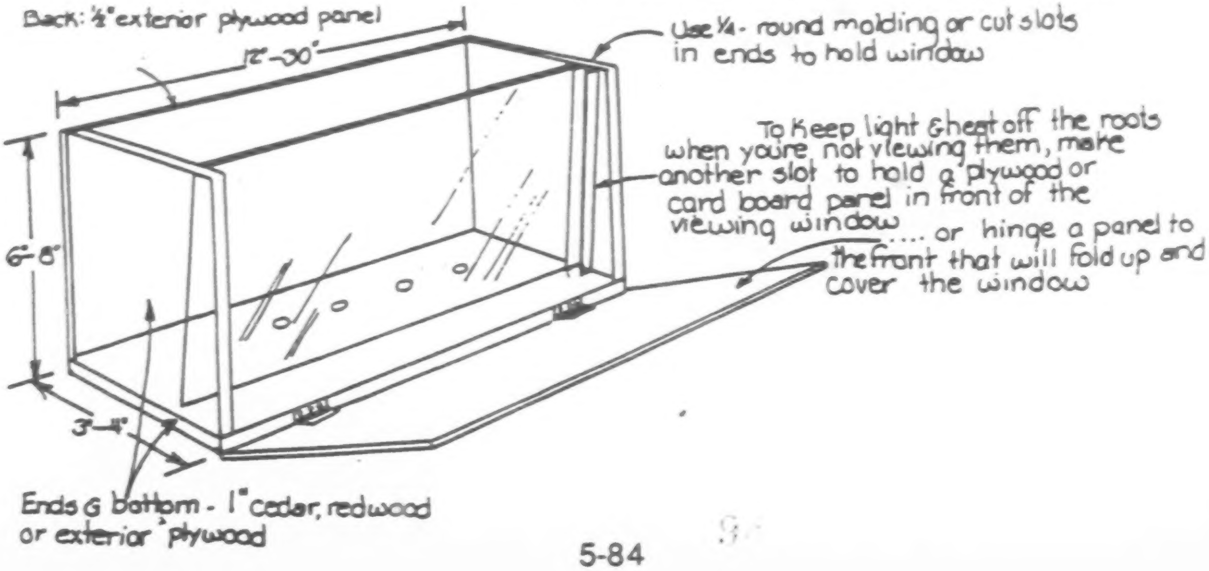
Potting soil
Root viewboxes (or other containers)
Sunlight
Water

BACKGROUND: Plant roots grow in relation to the amount of water they receive. If they receive too little water or too much, they will not grow properly.

ACTIVITIES:

1. Plant the seeds in the root view box. If one is not available, the experiment can be done by planting in soil and digging up 1 or 2 seedlings each day to examine the roots.
2. After the seeds sprout, water each root box differently. Water one root box once a week, and the other, once every 3 days. Make sure the box (or containers) are thoroughly wet.

To Build a Root-View Box


Back: ½" exterior plywood panel
12"-30"
Use ¼-round molding or cut slots in ends to hold window
To Keep light & heat off the roots when you're not viewing them, make another slot to hold a plywood or card board panel in front of the viewing window .... or hinge a panel to the front that will fold up and cover the window
6-8"
3"-4"
Ends & bottom - 1" cedar, redwood or exterior plywood

CHANGE

TEACHER MATERIALS

CONCEPT: Social Studies - change (historic page 86)
- technology
(economic pages 56, 58)

OBJECTIVE: Students will differentiate between current agricultural practices and past practices.

BACKGROUND: Modern technology has changed agriculture tremendously, yet many pictures in textbooks, commercials and T.V. shows continue to depict farming as it was in the past. This lesson is designed to develop an awareness of agriculture as it is today and to help students recognize inaccurate representations. This lesson could be an ongoing activity while doing other agricultural activites.

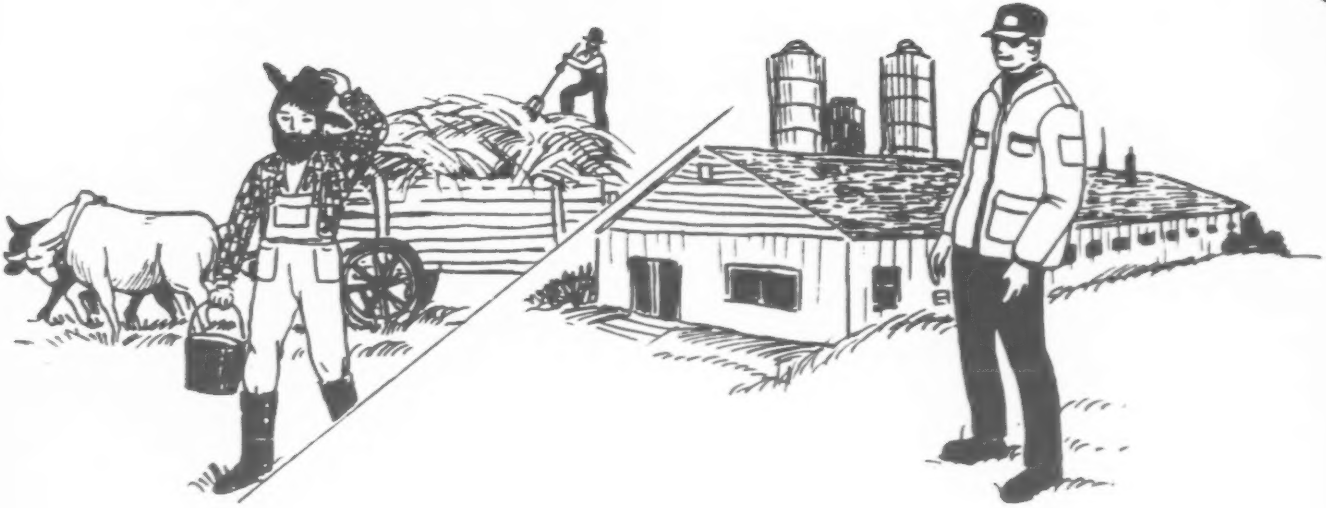
ACTIVITIES:

1. Ask the students to describe what agriculture is. (How do they imagine a farm to look?) Write down their answers. Encourage them to think of agriculture as more than farming.

2. Create a bulletin board which is divided into two sections. On one section, place pictures of modern farming techniques. On the other, place outdated farming techniques. On each bulletin board, include non-farming pictures to illustrate modern technology vs. outdated technology. Examples for outdated section: horse and buggy, covered wagon, Model-T Ford, people in outdated clothes and hairstyles, people milking cows by hand, old tractors, team of oxen. Examples for the modern section: jets, tractors and cars, clothes and hair styles, milking parlors, silos, and combines.

Have students find pictures in magazines to put on bulletin board. Leave display up so it can be added to while doing lessons on technology in agriculture.

3. While doing other school activities, be alert for pictures in textbooks showing inappropriately outdated pictures of agriculture. Call attention to them in class and ask students to be alert for such pictures.
4. Introduce and discuss the topic of stereotypes.



TEACHER MATERIALS

CONCEPTS: Social Studies - technology
(economic pages 56-58)
- interdependence
(economic pages 52, 80)
- scarcity
(economic pages 48, 50, 54)

OBJECTIVES: Students will trace the path of food/fiber from production to consumption.

BACKGROUND: Agriculture today is very diverse and depends upon the interrelationship of producers, processors, transporation systems, wholesalers, and retailers. This lesson is designed to make the students aware of these interrelationships and of their importance.

ACTIVITIES:

1. Make copies of the next 4 pages.

2. Read p. 10 in *New York's Big Apple* and the attached information sheets. Discuss the meaning of the terms of producing, processing, transportation, wholesaling, and retailing. Then have students work individually or in groups to research another product and trace its path from producer to consumer. The report can be presented in written or oral form.

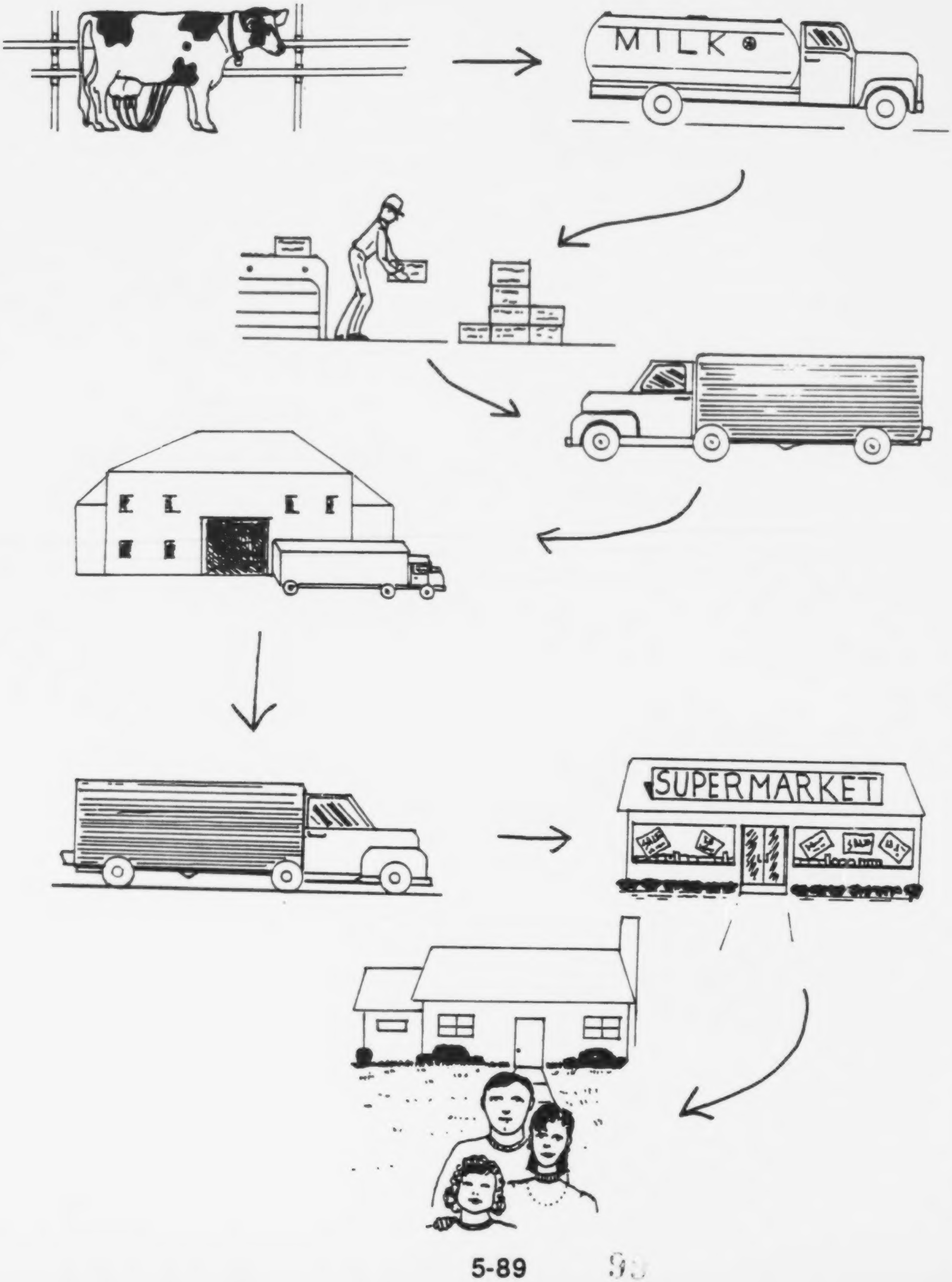
3. Working in groups, have students use information gathered from their research in Acitivity 2. The teacher introduces a problem in the path from production to consumption and the group tries to think of solutions to

the problem. Examples of problems are: bad weather has caused a poor crop; the transporation system has broken down; the processing plant has gone out of business; or the workers in a major retail chain are on strike.

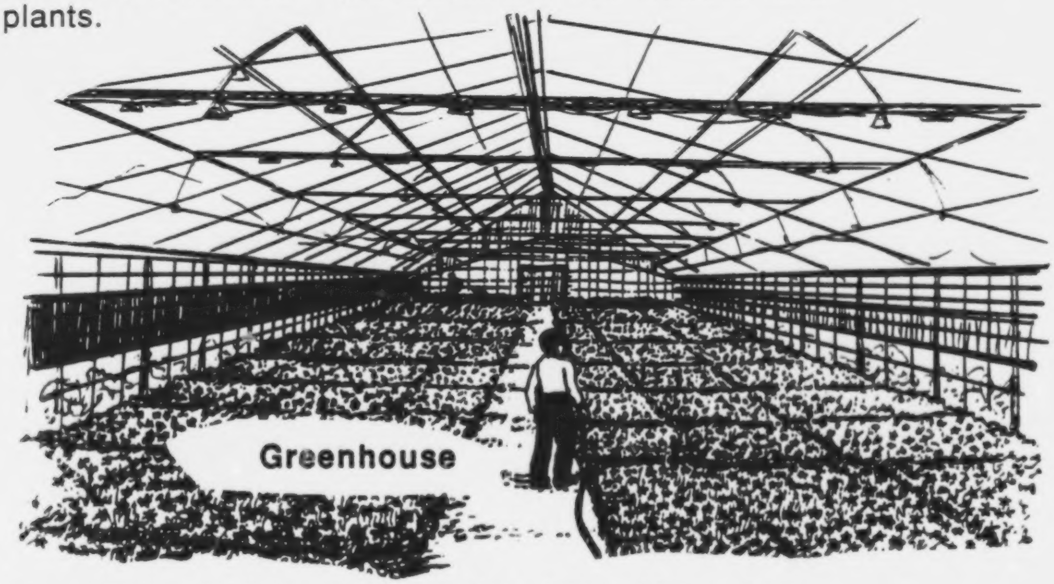
4. Have a panel discussion with 5 students who represent Production, Processing, Transportation, Wholesaling, and Retailing. Have each of the 5 students try to provide a convincing argument that they represent the most important step in the path.

SUPERMARKET

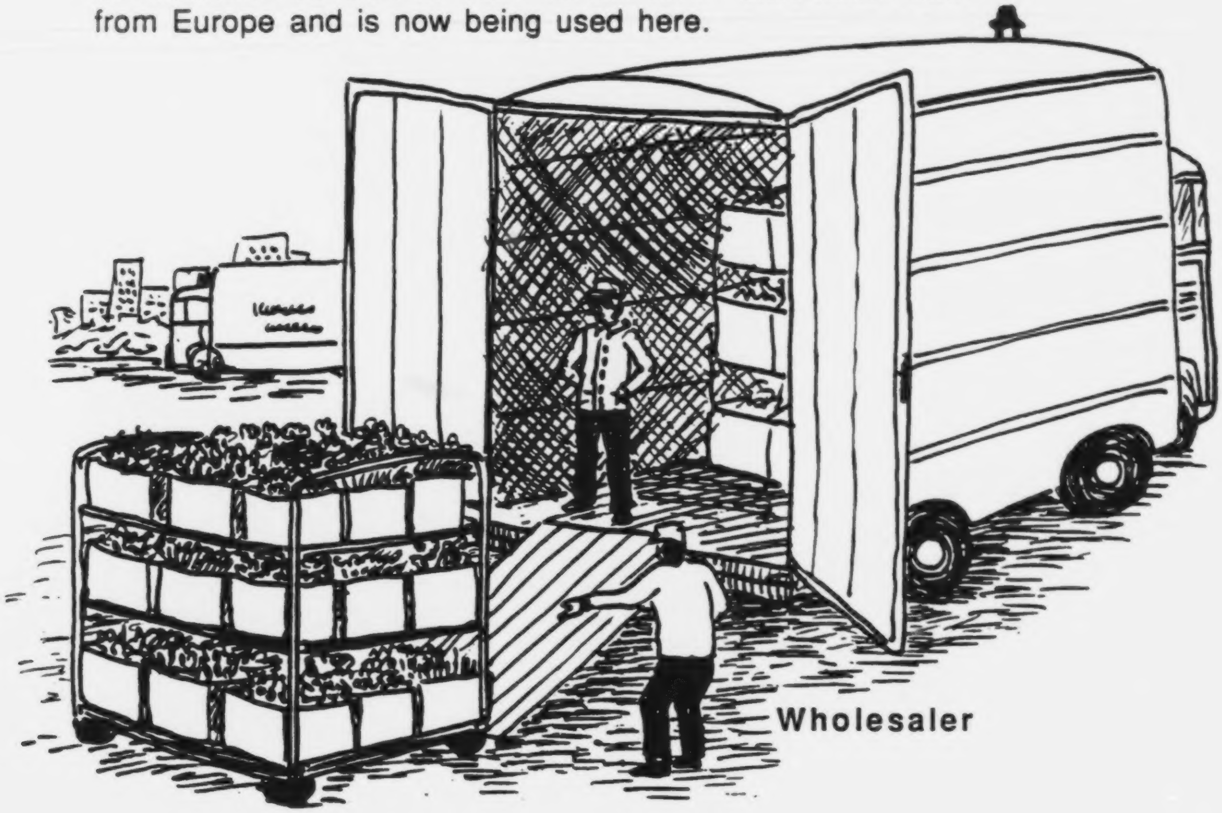
The path most food follows from producer to consumer is:

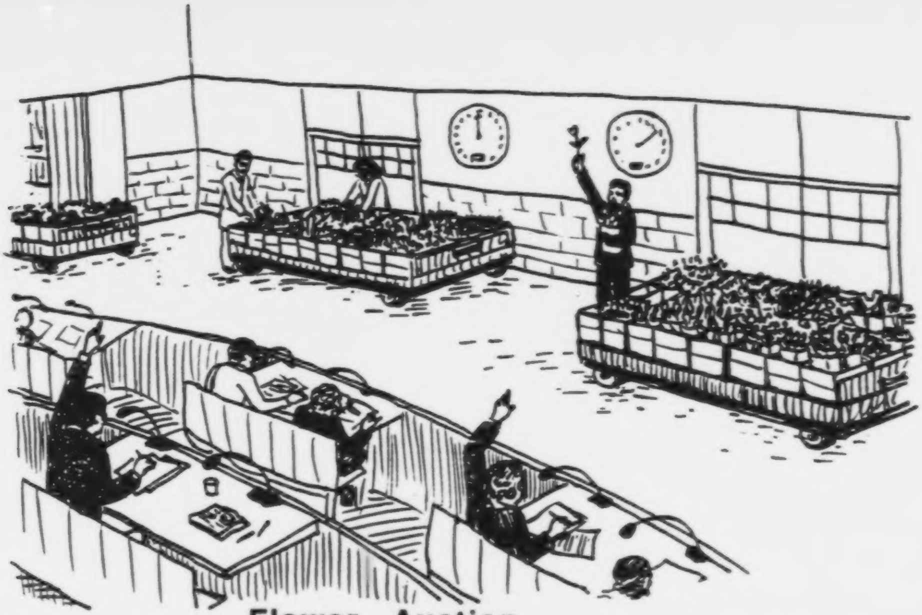

MILK
SUPERMARKET

But the products of some businesses take a slightly different path. In the flower business one of the areas of production is greenhouse production of cut flowers and potted plants.



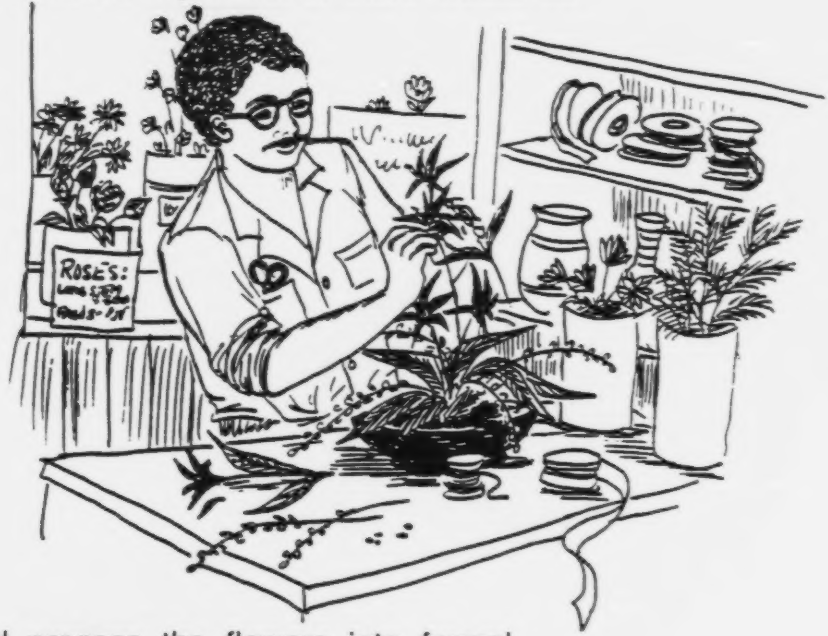
The flowers are trucked to a wholesaling firm. Very often the flowers are sold in "lots" at auction. This idea came from Europe and is now being used here.





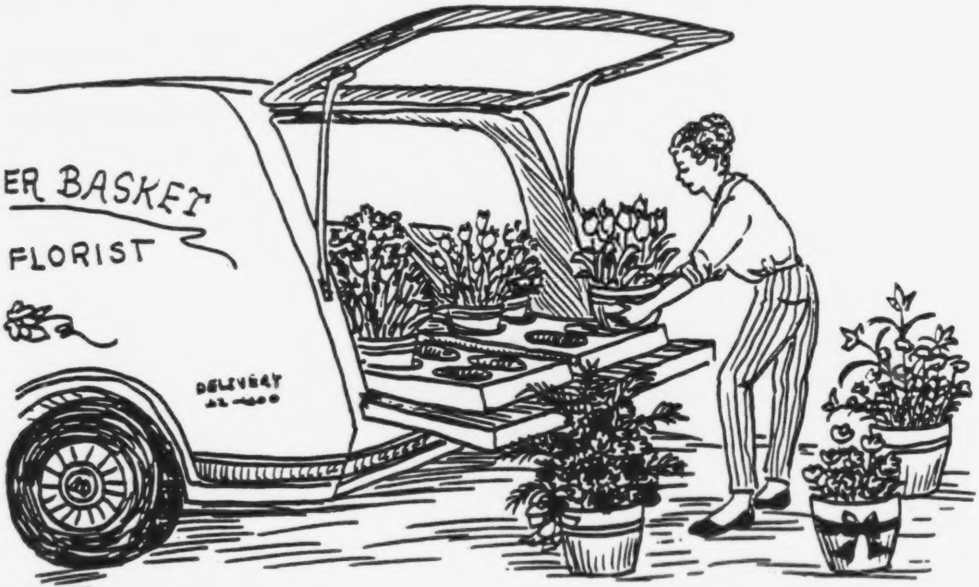
Flower Auction

After being sold, the flowers are trucked to the place the buyer does business. This is usually some type of retail outlet. It can be a grocery store. Here the plants would be sold as cut flowers or potted plants. The only processing that would be needed would be to package the flowers into bouquets or dress the plants up with foil wrapping around the pot and maybe add a bow. A plastic sleeve would also be placed around the flowers or plant to prevent damage. If the flowers were purchased by a florist there would be more processing.

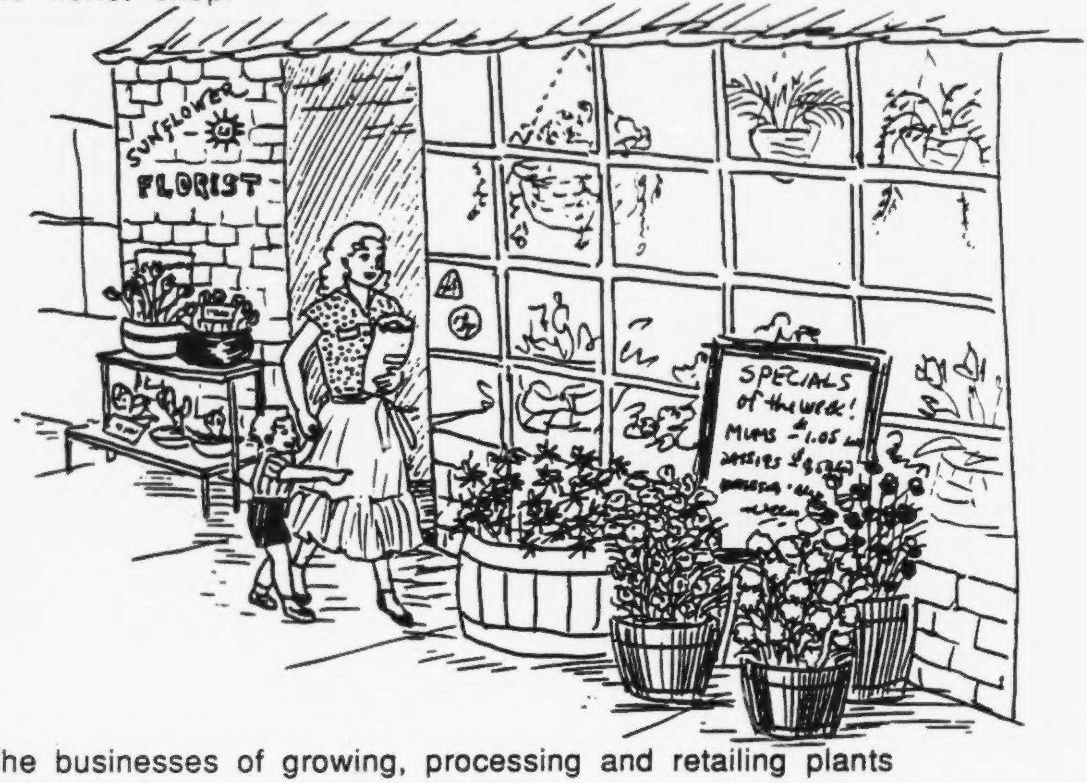


Florist

The florist would process the flowers into formal arrangements, corsages, bridal bouquets, or arrange live plants into more decorative arrangements like a terrrarium or a dish garden. Then the flowers or plants would be trucked to the consumer.


ER BASKET
FLORIST
DELIVERY

The consumer may also pick-up flowers or plants right at the florist shop.


SUNFLOWER
FLORIST
SPECIALS
of the week!
MUMS $1.05

The businesses of growing, processing and retailing plants and flowers is known as horticulture.

- scarcity
- environment
- empathy

TEACHER MATERIALS

CONCEPTS: Social Studies
- scarcity (economic pages 48,50,54)
- environment (geographic page 44)
- empathy (historic page 86)
- change (historic page 86)

Reading - comprehension
Listening and Speaking

OBJECTIVES: The students will learn about the lifestyle components of a variety of careers, including agricultural careers.

The students will apply their knowledge of the lifestyle components of careers to their own interests and personality characteristics.

BACKGROUND: The discussion of careers often focuses primarily upon the product or service provided by that career. That information may not be an indication of the way time is spent in a career. This lesson is designed to help students understand careers from a lifestyle perspective in order to relate their own preferences to a career.

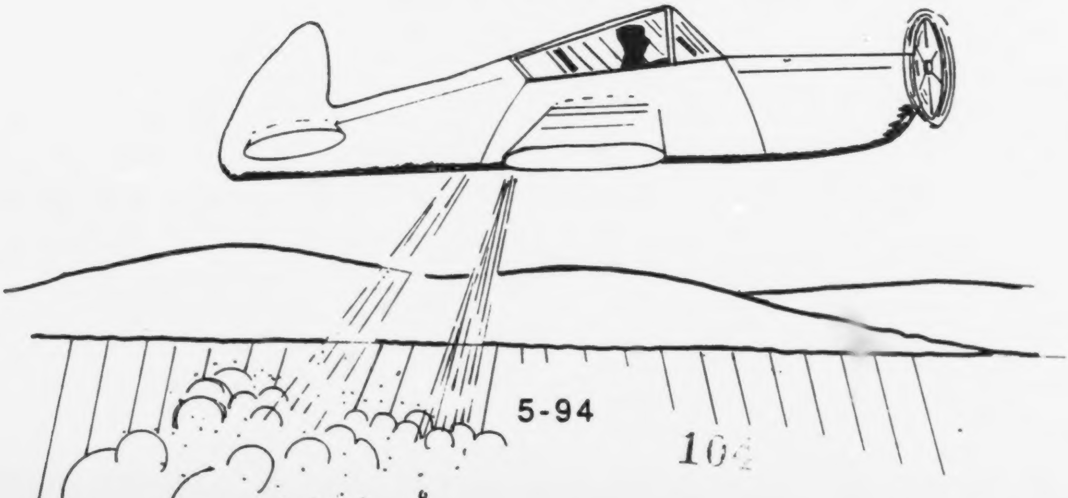
ACTIVITIES:

1. Make copies of the questionnaire for each student. Have them interview their parents or an adult friend and fill out the questionnaire. Discuss the meaning of each of the questions with the class before the interviews.

2. Invite guest speakers to the class from a variety of agriculture-related careers. A wide variety of careers would be most effective. For example: a farmer, a veterinarian, a researcher, a grocer, an agriculture teacher, an extension agent, a processing plant worker, a distributor, a greenhouse employee, a forester, a wildlife technician, a marine science person and a golf course worker. Your local extension agent can help you find appropriate guest speakers. Give the speaker a copy of the letter asking him/her to speak on certain topics. Give the students a copy of the questionnaire to fill out in response to the speaker. Discuss the meaning of each question with the class before the speaker arrives. Include in the discussion how careers vary around the world and in different countries. Compare farmers in the United States with Mexico.

3. After listening to the guest speakers and/or doing personal interviews, have the students write an essay telling which career(s) they would prefer and why, based on lifestyle. The students may also present their preferences orally to the class.

4. Have the students do the exercise in *New York's Big Apple* on pages 21 and 22.



QUESTIONNAIRE ON CAREERS

Student's name____________________Date______________

Name of person interviewed ___________________________

Career of person interviewed __________________________

1. Do you work mostly indoors or out of doors?

2. What hours do you usually work?

3. Do you work with machines? What kinds?

4. Does your job require much physical work?

5. Do you work with animals? What kinds?

6. Do you work with other people, or alone?

7. Does your work include other family members?

8. Does your work require you to travel often?

9. Does your work require you to stay home a lot?

10. How much formal education is required by your job?

11. Do you work for yourself or for someone else?

12. What do you like best about your job?

13. What do you like least about your job?

TO OUR GUEST SPEAKER:

Our class is studying careers, particularly from a lifestyle perspective. We want to know realistically how you spend most of your time on your job and how your work affects your life. The students will have a list of questions about your job which are included here.

1. Do you work mostly indoors or out of doors?
2. What hours do you usually work?
3. Do you work with machines? What kinds?
4. Does your job require much physical work?
5. Do you work with animals? What kinds?
6. Do you work with other people, or alone?
7. Does your work include other family members?
8. Does your work require you to travel often?
9. Does your work require you to stay home a lot?
10. How much formal education is required by your job?
11. Do you work for yourself or for someone else?
12. What do you like best about your job?
13. What do you like least about your job?

The questions are worded simply, but please elaborate on those questions that have particular significance in your career. For example, in answering the question about the hours you work, it would be helpful to tell whether you have regular hours or not, and what the nature of the irregularities are. Do you have to get up especially early to milk cows, is your work day split into different parts, do you somtimes have to respond to emergencies after hours or late at night, do you work weekends, etc.?

If there are any additional questions you would like to address, please feel free to add them to the end of your presentation.

We appreciate your taking the time to share this information with our students. We feel this information will help our students think realistically about career choices.

TEACHER MATERIALS

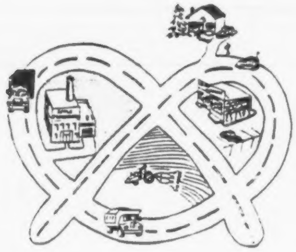
CONCEPT: Social Studies - interdependence (economic page 52)
- technology (economic page 58)
- scarcity (economic page 50)

Reading - comprehension

OBJECTIVE: The students will recognize the interrelationships of all sectors of agriculture with other industries and the community.

BACKGROUND: People who work in any agriculture related occupation form a network of interrelationships and interdependence with people in all other occupations. This lesson is designed to make this interdependence apparent to each student in terms of his/her own life.

ACTIVITIES:



1. Read pages 12-13 in *New York's Big Apple,* "Life is a Pretzel." As a class activity, allow the students to tell the class the occupations of their parents. Write these on the board, noting particularly any agriculture-related occupations.

2. Hold a class discussion of the occupations to see how they are interrelated. There may be direct connections between some, but there may be missing links between others. Have the students think what some of the missing links might be. You may need to help them.

3. Using the information on the board, the students can write a class version of the "pretzel". They may need to invent some people to fill the missing links.

- culture
- interdependence
- scarcity

TEACHER MATERIALS

CONCEPTS: Social Studies - environment
(geographic pages 40, 44)
- scarcity
(economic pages 48, 50)
- interdependence
(economic page 52)
- culture
(social pages 64, 68, 84)
- empathy
(geographic page 40)
(historic page 86)

OBJECTIVES: The students will prepare a nutritious meal of American foods much like the colonists would have done.

1. Have the students study the foods and fibers that come from America on pages 22-27 of *New York's Big Apple*. Then plan, cook, and eat a nutritious meal using those foods. (There are many more. Some appear in the 4th grade booklet.)

2. Using Nutrition Comes Alive (available through Cornell Cooperative Extension in your county) discuss with the students the positive impact the Indians had on the nutrition of the colonists.

3. Have the students complete the crossword puzzle on pages 28-29 of *New York's Big Apple,* as indicated in the Language Arts materials.

4. Complete the next two lessons.

culture, change

CONCEPTS: Social Studies - culture
(social pages 64, 68, 84)
- change
(historic page 86)

OBJECTIVES: Students will understand what life was like for the pilgrims and colonists.

BACKGROUND: The Meat Industry Council has produced the poster Coming to America which can be found in the Resource section of this notebook. Not only is the poster a colorful display for the unit you may teach on the pilgrims/colonists but on the back are many activities and a great deal of information for your use.

This poster was sponsored by the New York Division of the National Pork Council Women. More information about the swine industry in New York State can be obtained by writing to Pat Schrader, President, 5171 Clinton Street, Elma, New York, 14059 .

Also take note, that toward the bottom of the poster back on the left hand side is information to obtain a kit for Thanksgiving.

ACTIVITIES: See poster in the Resource section.

TEACHER MATERIALS

CONCEPTS: Social Studies - citizenship
(political pp. 78, 82)
- change (historic p. 86)
- culture (social p. 68)

Reading
- comprehension
- vocabulary

OBJECTIVE: The students will be able to describe Washington and Jefferson as agriculturists.

BACKGROUND: The structure and precepts of the Constitution were greatly influenced by the fact that its writers and adopters were, for the most part, farmers. 90% of the population of the United States of America was on the land in 1787. Although relatively affluent, Washington and Jefferson were farmers. The reality of the importance of agricultural productivity and trade was apparent to both. They also understood quite well how close to the edge of starvation and failure mankind lived.

ACTIVITIES:

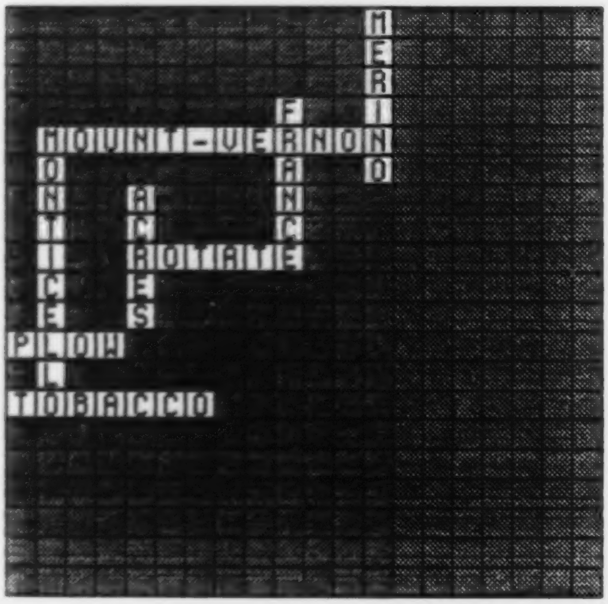
1. Have the students read "George Washington and Thomas Jefferson as Farmers".

2. Have the students complete the crossword puzzle.

3. Ask the students to draw their own version of Jefferson and Washington working their plantations.

4. Have the students read other stories of the members of the Constitutional Congress. (Life magazine special fall 1987 issue and the September 1987 issue of Reader's Digest highlight the Constitution, for example.)

Answers: WASHINGTON AND JEFFERSON


MERIND
FRANCE
MOUNT-VERNON
MONTICELLO
ACRES
ROTATE
PLOW
TOBACCO

GEORGE WASHINGTON & THOMAS JEFFERSON
as farmers

When the Constitution of the United States of America was written, nine out of every ten people in the new country were farmers. It is not surprising that two of our most important leaders were agriculturists. Both George Washington and Thomas Jefferson were leaders in making agricultural changes.

George Washington and Thomas Jefferson loved the land and their plantations. The president of the Constitutional Congress, George Washington, used his plantation as an experimental farm. Mount Vernon was the site for tests on new seeds, ideas, machines and livestock. Thomas Jefferson was a diplomat in France at the time of the convention, but he had a political influence on the constitution. Jefferson pioneered the use of new crops and farming methods. The two Virginians would often write each other about farm problems. They both also kept in touch with leading European agriculturalists.

GEORGE WASHINGTON

George Washington was a statesman, explorer, military leader and the father of our country. But his first love and desire was to be a farmer. George Washington grew up in tidewater Virginia. He lived the life of a southern planter. His time serving as a surveyor, military leader, and first president of the United States always ended with his return to the land.

Washington was a large landowner even by today's standards. He owned 70,000 acres. It was divided into about five parts. Most of it was farmed by some 100 slaves. This was much larger than what was the average size at that time.

Washington moved to Mount Vernon in 1759. He began to grow tobacco as a cash crop like other planters in the tidewater region. He didn't do well as a planter. The land had been badly used. The soil was poor. The constant tobacco crops that had been planted took the nutrients from the soil. He also disliked depending upon British merchants. In the mid-1760's, Washington decided to diversify.

He planted wheat and corn and raised sheep for wool. To improve the soil and feed his livestock, he planted clovers and grasses. By operating a local grist mill he hoped to be independent. This diversity allowed him to rotate his crops. Rather than planting tobacco year after year after year, he would plant corn one year, wheat the next and then clover or grass for pasture or hay. By leaving the land in pasture or hay, it would improve the soil. (Clover puts nitrogen in the soil. Nitrogen is an important plant food.) The close, fibrous roots of the grasses would add organic matter to the soil. The clover and strong roots of hay or pasturelands prevent soil erosion and hold water. This plan for rotating crops is still used today to improve soil and reduce erosion.

Washington also experimented with new ideas. He spent years searching for good natural fertilizer (plant food). To test, he would plant crops in different soils under different conditions. He would control the conditions he placed the crops under. When possible, he had the mud dredged from the Potomac River and placed on this fields. As one visitor commented, the regular toast at Mount Vernon was "Success to the Mud!"

To stop erosion, Washington had drainage ditches dug to control the flow of water. This met with little success. Another experiment was to develop an improved plow. Still another was to grow improved strains of wheat. Perhaps his greatest success was to introduce the mule to America. The King of Spain gave Washington a gift of a prize jackass. Afterward, Washington bred and sold mules.

George Washington kept careful records of his farm work. While he was on duty fighting the revolutionary war or serving as President, he sent his overseers detailed instructions. Each of his overseers was required to send him regular reports. This helped him to keep up-to-date with his farms and make decisions. He often traded information on farming with leading agrarians. One such leader was Arthur Young of England. He belonged to one of the first American agricultural societies, the Philadelphia Society for the Promotion of Agriculture.

In the end, none of these efforts made Mount Vernon profitable. Infertile soil, inefficient slave labor, and poor farm management while he was away added up to keep him on the verge of debt. But he had a lasting influence on American Agriculture. His devotion to agricultural improvement made him the first President to recommend an office on agriculture. This would later come true in 1862 in the form of the United States Department of Agriculture. At his death in 1799, he left another legacy - he freed his slaves.

THOMAS JEFFERSON

Thomas Jefferson, like George Washington, was a planter. He lived in Virginia. Jefferson grew up further west in Virginia, close to the frontier. On the frontier, freedom went hand in hand with democracy. Each man and woman made their own decisions and lived with the results, good or bad. This upbringing molded Jefferson's political views. He knew that farmers who could be independent (economically and politically) were necessary for a democracy.

Monticello was the name of Jefferson's mountaintop home. He farmed about 2,000 acres with 200 slaves. As with Mount Vernon and George Washington, the farms did well when Jefferson was at home and poorly while he served his country.

While Jefferson served America in Europe, he spent his free time finding new seeds, plants and ideas. He would take these back to his home and experiment. His interest was scientific. He didn't just use new things, but tried to find the best.

Jefferson's wide interests made him curious about almost anything agricultural. He planted new varieties of corn, barley, peas, and clover. He eagerly planted seeds sent back by Lewis and Clark from their western trek (1804-1806). Another plant Jefferson experimented with was the European grape. Jefferson loved fine European wines. He was unable to get the European grapes to grow in America. (This has only been done in the past few years.)

Along with plants, Jefferson was interested in improving livestock. He promoted the use of improved breeds of sheep. The Merino from Spain was a favorite. Merino sheep are known for their excellent wool. By breeding American sheep to the Merino, the quality of wool produced would improve.

While Washington liked to tinker with machines, for Jefferson it was a passion. He invented a new grain drill, corn cob crusher, and corn sheller. (A corn sheller removes the kernels from the ear.) The most important invention he had was a new plow. He created a plow that could be easily copied, exactly, by any country craftsman. None of Jefferson's inventions were widely used, but his plow won enough scientific praise that he was honored with a high French award.

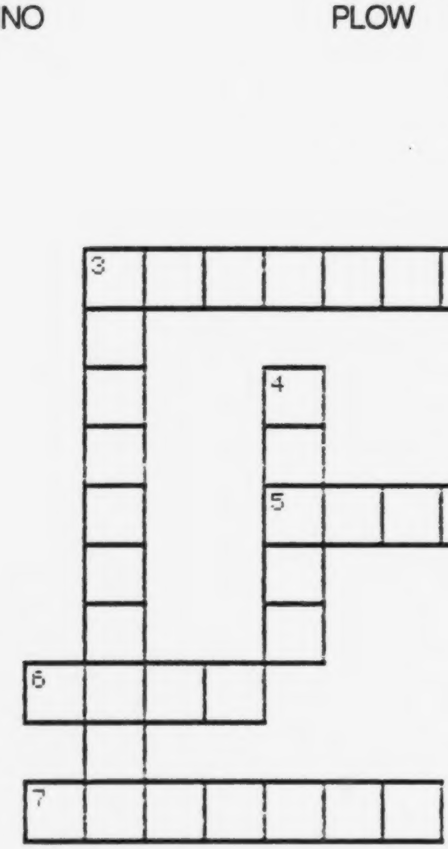
Like Washington, Jefferson's most lasting gift to agriculture was in policy. He served on committees which drafted the land ordinances of 1784 and 1785. Selling America's vast lands to farmers was the result. He also supported education in agriculture. Colleges teaching better methods of farming and a system of county agricultural societies were two of his dreams. He envisioned a system for agriculturists to exchange ideas and information much like we have today.

Name_______________________________Date____________________

WASHINGTON AND JEFFERSON

DIRECTIONS: Use these words to complete the crossword puzzle:

ACRES
FRANCE
MERINO
MONTICELLO
MOUNT-VERNON
PLOW
ROTATE
TOBACCO



Across

3. Washington's home (two words)
5. Washington would __________ his crops to improve the soil.
6. Jefferson won a French award for his_________.
7. Washington couldn't grow this crop because of poor soil.

Down

1. breed of sheep Jefferson promoted
2. Jefferson served in ______________as a diplomat.
3. Jefferson's home in western Virginia
4. Washington owned 70,000 ________ of land, most of it on the frontier

TEACHER MATERIALS

CONCEPT:

Social Studies - technology
(economic pages 56, 58)
- change
(historic page 86)
- empathy
(historic page 86)
Mathematics - sequencing
Reading - making titles

OBJECTIVES:

1. The students will recognize specific technological advances that have had an impact on food and fiber production.

2. The students will recognize the dependence of society upon agricultural efficiency and productivity.

BACKGROUND: Specific examples of technology in agriculture are important in demonstrating the increased efficiency of food production. It may not be readily apparent to students that our entire society benefits from technology in agriculture by having access to a wide variety of foods, year round, at relatively low cost. The activities are designed to increase awareness of both the technological advances in agriculture and the importance of these advances in all of our lives.

ACTIVITIES:

1. Read the history of agricultural inventions to get an overview of advances which have benefited agriculture. Compare the time required to do specific farm work before and after a certain invention became available.

2. Using the attached pictures, create a timeline of inventions, agricultural and otherwise.

3. Have students choose an invention from the above activity and research it in the library, or research the life of one of the inventors. They may write a report and/or make an oral report to the class of their findings. Questions for the student to answer in their research could include:
    - Who was the inventor?
    - When and where was it invented?
    - What job does the machine do, or what machine does it replace?
    - How has it increased farmers' efficiency?

4. Class discussion of the effects which the efficiency of modern agriculture has on our lifestyle. The following information can be used to trigger a discussion relating to the variety of ways we can spend our time now compared with people in 1700.

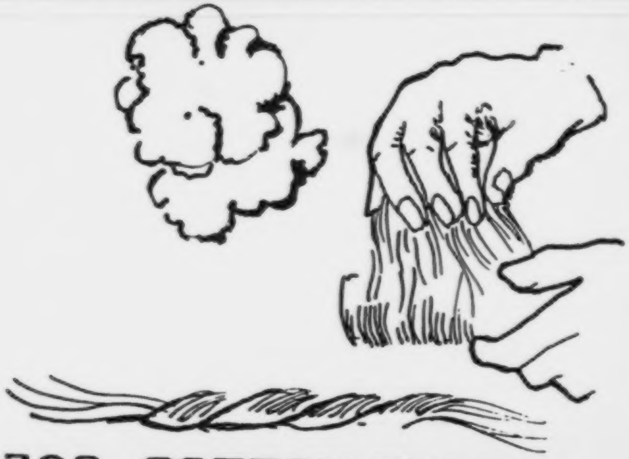
    - 1 farmer fed 3 people in the 1700's.
    - 1 farmer fed 79 people in 1980.
    - 1 farmer feeds more than 100 people today.

5. Working in groups, have the students brainstorm to think of something which needs to be invented to solve some kind of problem or increase productivity. Then have them report to the class. They could also do a creative writing assignment describing their invention: what it looks like, what it does, how to use it, etc.

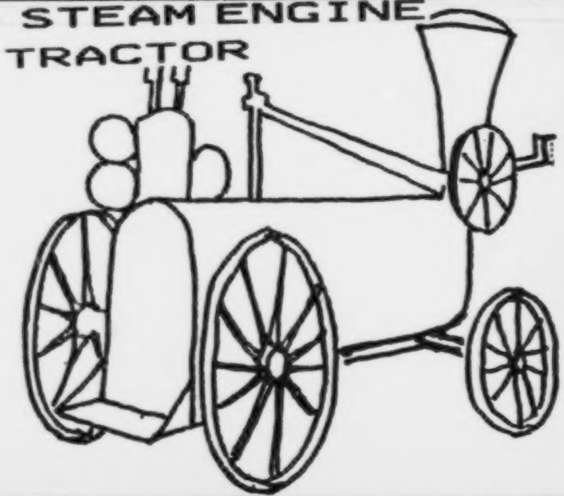
6. Play "What if...?" As the students to think about how farming would be affected if suddenly there were no more

tractors made, or fuel available, or no milking machines, or no electricity, etc. How would these changes affect the rest of society? The students may write stories or have a class or group discussion about the results of the suggested change.

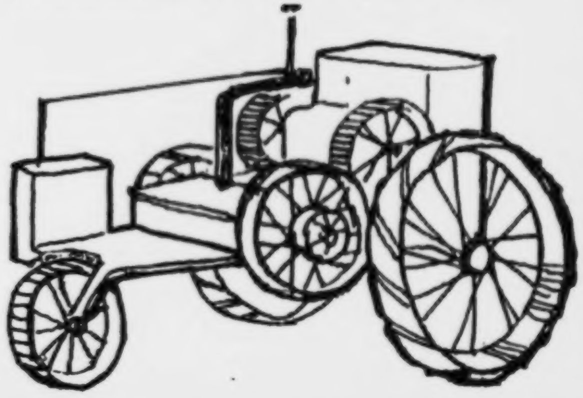
7. Have the students complete the worksheet "What do you think?"



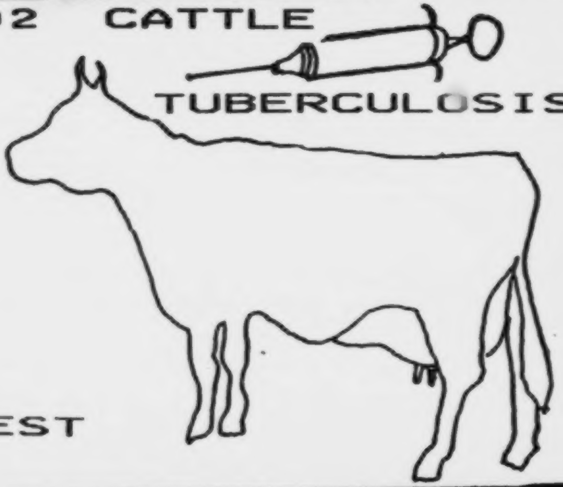
1793 COTTON THREAD



1885 STEAM ENGINE TRACTOR

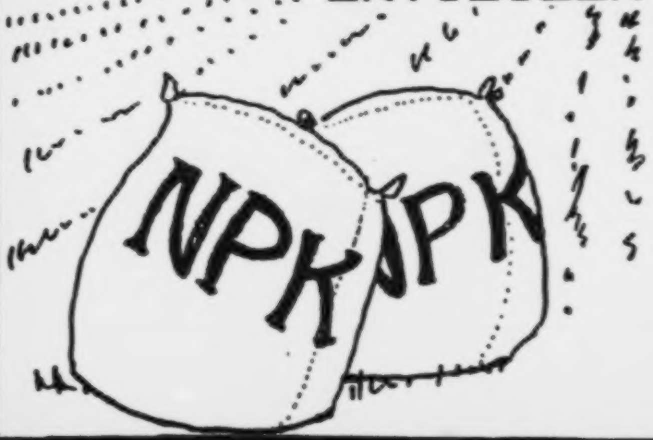


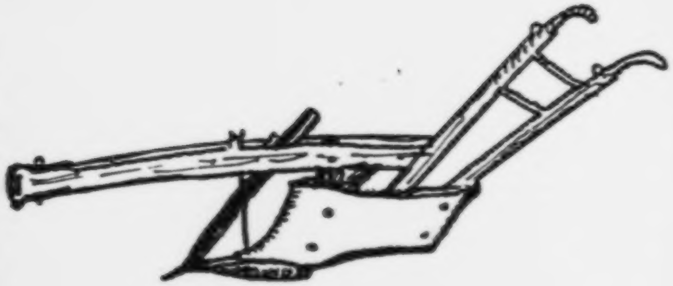
1908 PETROLEUM TRACTOR



1892 CATTLE TUBERCULOSIS TEST

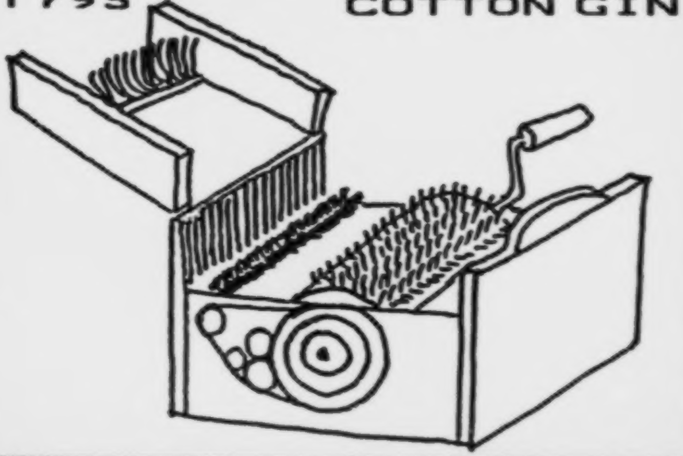
1849 COMMERCIAL FERTILIZER

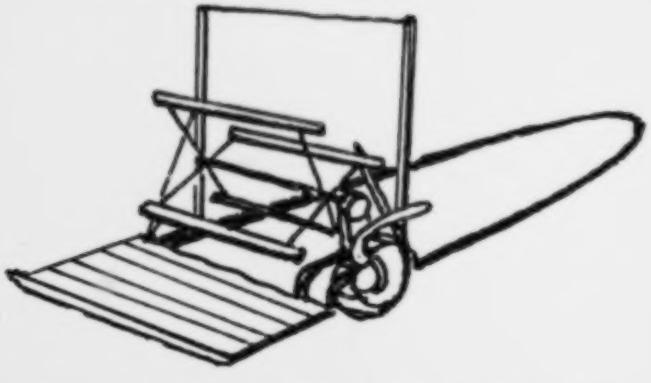




1819 CAST IRON PLOW

1793 COTTON GIN

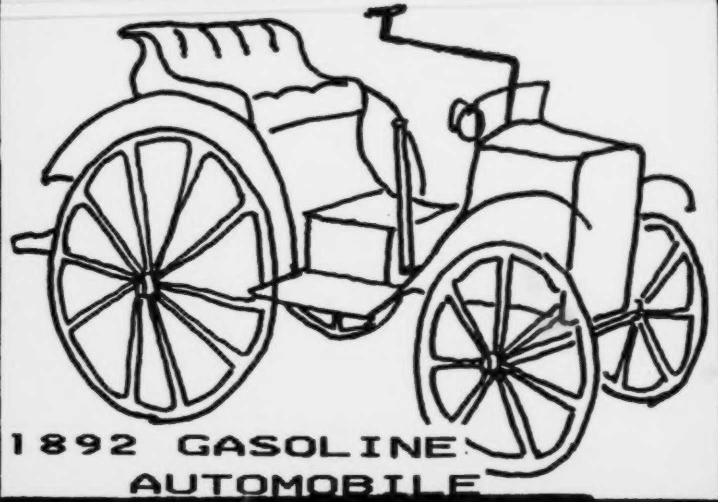


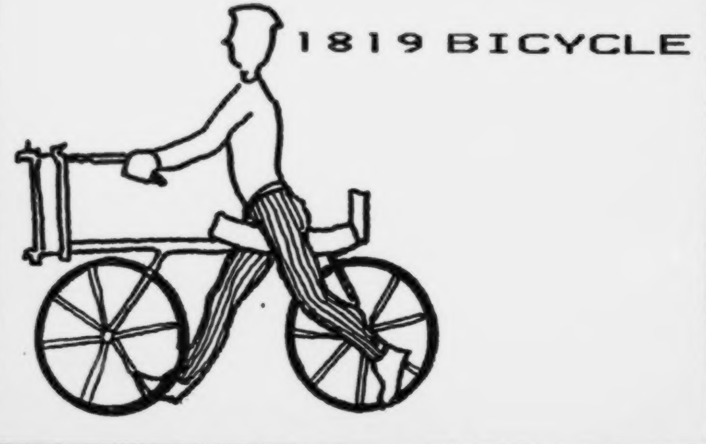


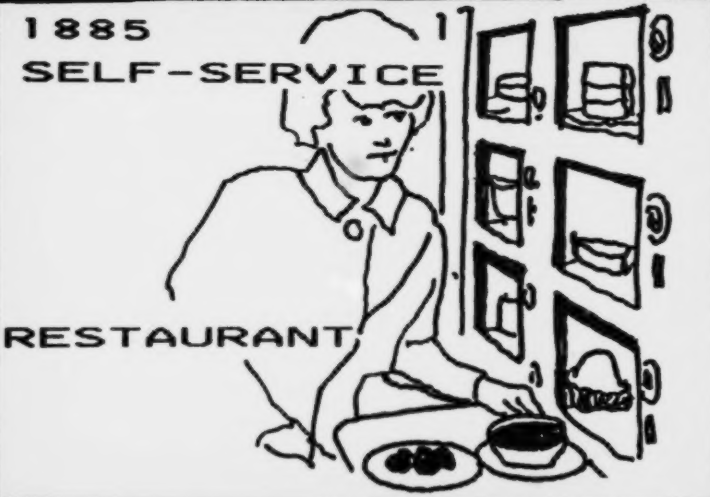
1833 MC CORMICK REAPER

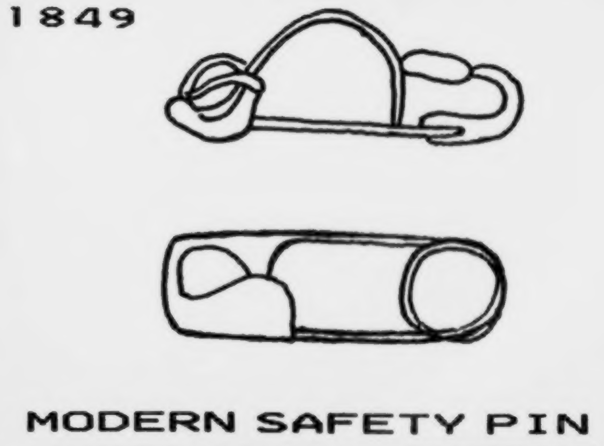
5-113

5-114

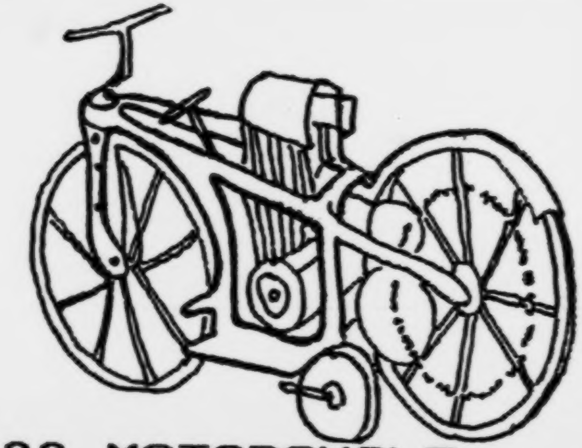

1892 GASOLINE AUTOMOBILE


1819 BICYCLE

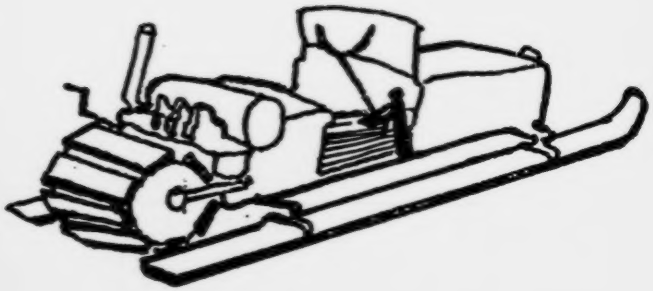

1885 SELF-SERVICE RESTAURANT


1849 MODERN SAFETY PIN

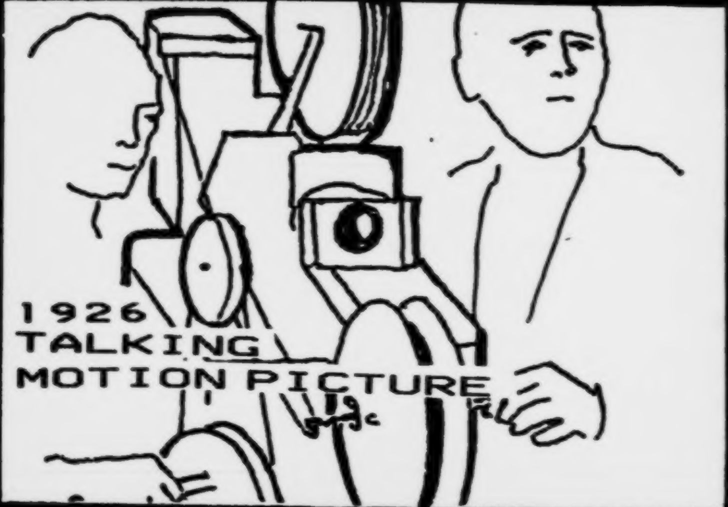
5-115



1900 MOTORCYCLE

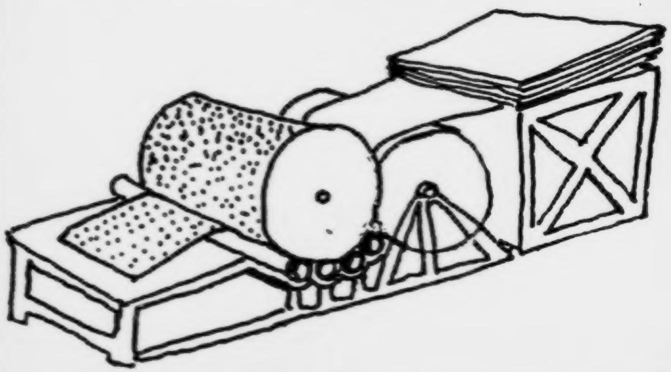


1927 SNOWMOBILE



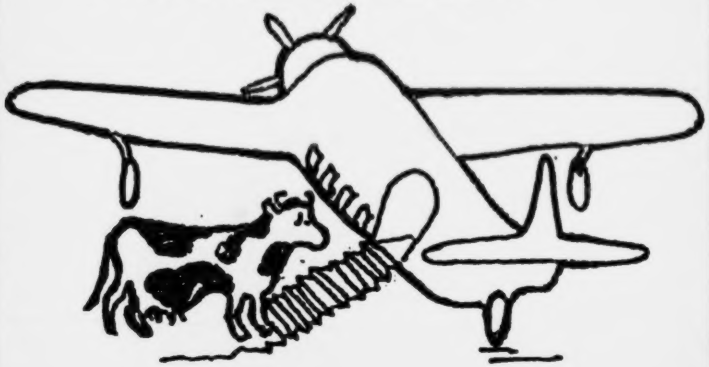
1926 TALKING MOTION PICTURE

1831 CYLINDER



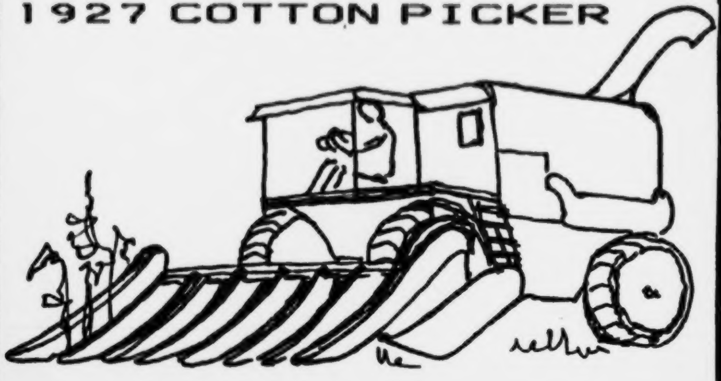
PRINTING PRESS

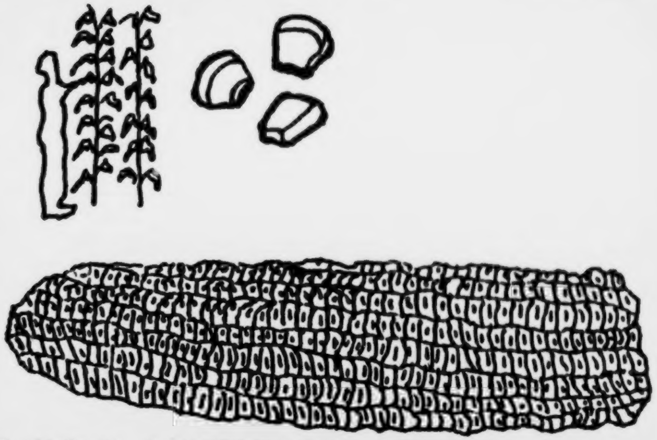
1930 COW FLIES



IN AN AIRPLANE

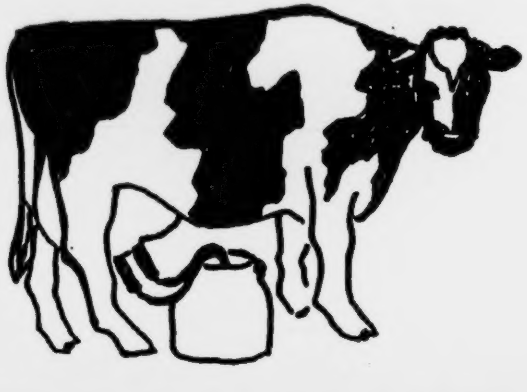
1927 COTTON PICKER





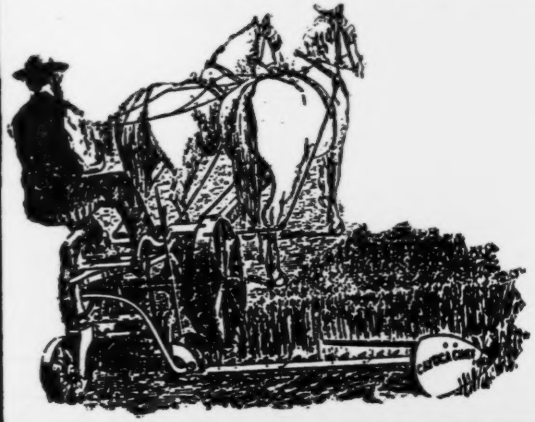
1926 HYBRID SEED CORN

1900 MILKING MACHINE



5-117

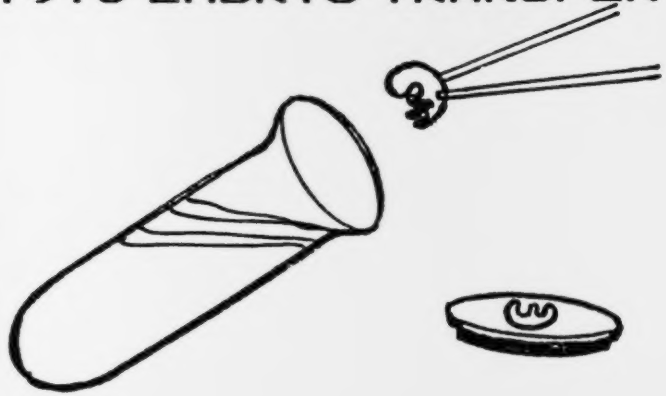
1831 MOWING MACHINE



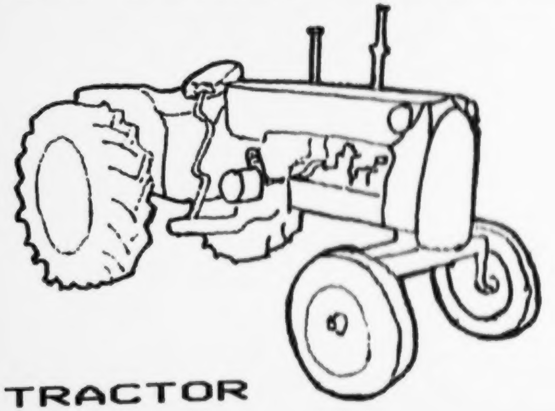
1933

NEW YORK DAILY SUN
First Penny Daily

1975 EMBRYO TRANSFER

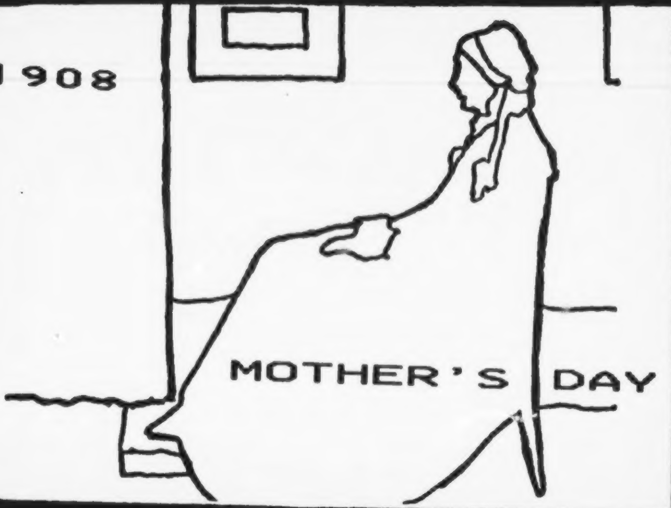


1930 DIESEL ENGINE



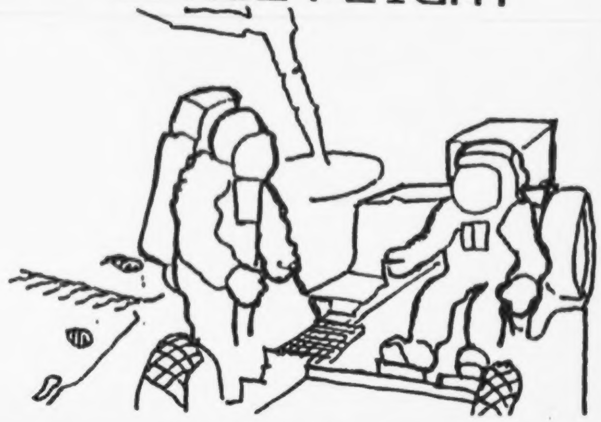
TRACTOR

1908

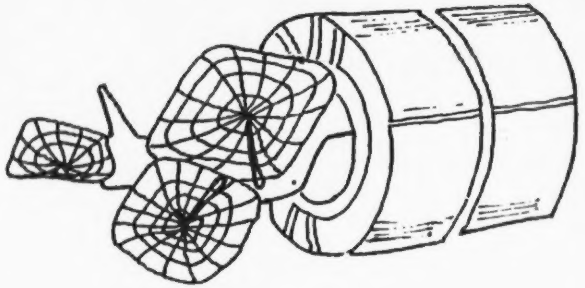


MOTHER'S DAY

1975 INTERNATIONAL SPACE FLIGHT



1963 COMMUNICATIONS



SATTELITE

1963 ARTIFICIAL INSEMINATION

5-118

Name ______________________________ Date __________

WHAT DO YOU THINK?

Match the agricultural inventions with other inventions that you think are from the same time period by drawing a line between them.

AGRICULTURAL INVENTIONS	OTHER INVENTIONS
Cotton Gin	Cotton Thread
Cast Iron Plow	Bicycle
Mowing Machine	Cylinder Printing Press
McCormick Reaper	New York Sun Newspaper
Commercial Fertilizer	Modern Safety Pin
Steam-Engine Tractor	Self-Service Restaurant
Cattle Tuberculosis Test	Gas Automobile
Petrol Tractor	Mother's Day
Hybrid Corn	Talking Motion Picture
Cotton Picker	Snowmobile
Diesel Engine Tractor	Cow Flies in an Airplane
Milking Machines	Motorcycle
Artificial Insemination	Communication Satellite
Embryo Transfer	American Astronauts Participate in International Spaceflight
	Bulldozer Invented
	Electric Razor Patented by Jacob Schick

ANSWER KEY

WHAT DO YOU THINK?

Match the inventions in agriculture with other inventions that you think are from the same time period.

AGRICULTURAL INVENTIONS	OTHER INVENTIONS
Cotton Gin (1793)	Cotton Thread (1793)
Cast Iron Plow (1819)	Bicycle (1819)
Mowing Machine (1831)	Cylinder Printing Press(1831)
McCormick Reaper (1833)	New York Sun Newspaper (1833)
Commerical Fertilizer (1849)	Modern Safety Pin (1849)
Steam-Engine Tractor (1885)	Self-Service Restaurant (1885)
Cattle Tuberculosis Test (1892)	Gas Automibile (1892)
Milking Machines (1900)	Motorcycle (1900)
Petrol Tractor (1908)	Mother's Day (1908)
Bulldozer Invented (1923)	Electric Razor Patented by Jacob Schick (1923)
Hybrid Seed Corn (1926)	Talking Motion Picture (1926)
Cotton Picker (1927)	Snowmobile (1927)
Diesel Engine Tractor (1930)	Cow Flies in Airplane (1930)
Artificial Insemination (1963)	Communication Satellite (1963)
Embryo Transfer (1975)	American Astronauts Participate in International Spaceflight (1975)

- interdependence
- environment

TEACHER MATERIALS

CONCEPTS: Social Studies
- interdependence (political page 80)
- environment (geographic page 40)
- emphathy (geographic page 40)

OBJECTIVES: The students will identify the major crop and livestock regions of the United States.

BACKGROUND: The major crop and livestock areas of the United States depend upon many geographical features, such as daylength, temperatures, terrain and soil type. Relative transportation difficulties also influence production. For example; fluid milk can only be transported relatively short distances or it becomes rancid. Therefore, milk for fluid consumption is produced near large population centers.

ACTIVITIES:

1. Using the information on pages 18-19 in *New York's Big Apple*, and the accompanying symbols, have the students make a wall size map of the United States and place these symbols on the areas of production. The symbols can easily be reproduced with a photocopier or ditto machine. They can then be cut apart and taped or pasted to the map the students have made.

2. The students can make the map three dimensional by adding pieces of the "real thing," i.e., corn seed, wool, cotton.

3. The students then should attempt to determine where the left over symbols belong.

Seafoods - coastlines

Livestock - corn and wheat areas, also grazing areas for sheep and beef

Small Fruits - near bodies of water (Great Lakes)

Citrus Fruit - tropical areas of Florida, Texas, and California

Cranberries - Northeast

Blueberries - Northeast

Poultry & Ducks - South, New York (Long Island is known especially for ducks.)

Maple Syrup - New York, Vermont

Vegetable Crops - large population centers

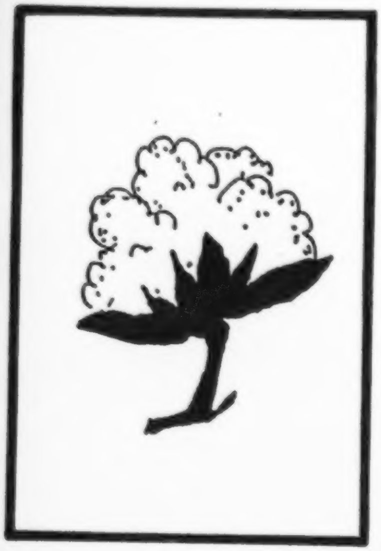
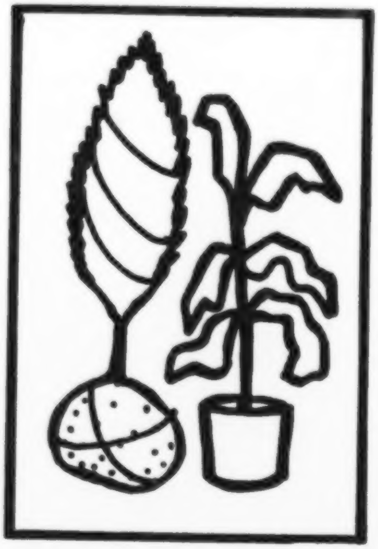
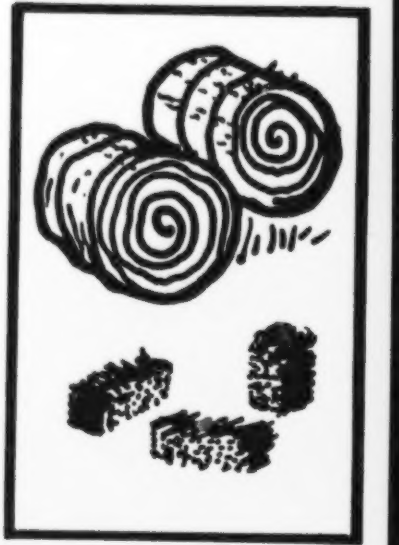
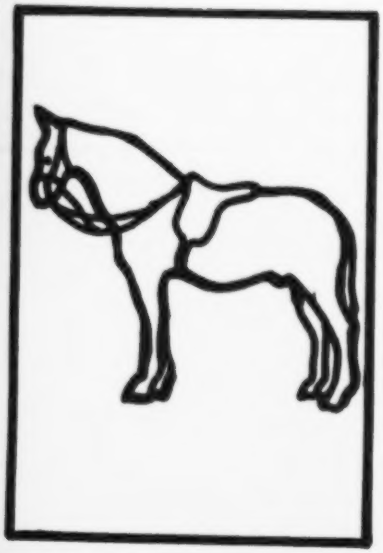
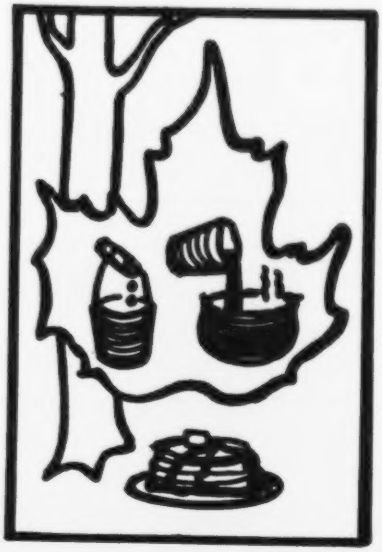
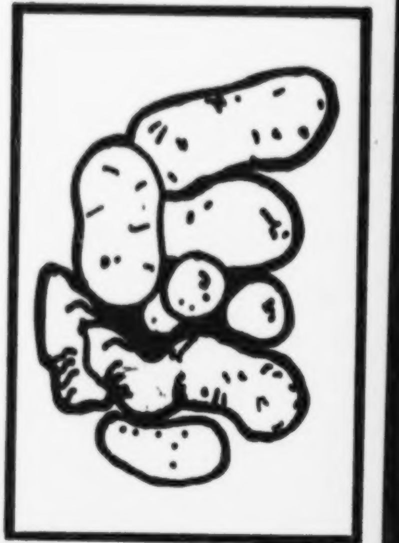
Potatoes - Long Island, Idaho, Maine

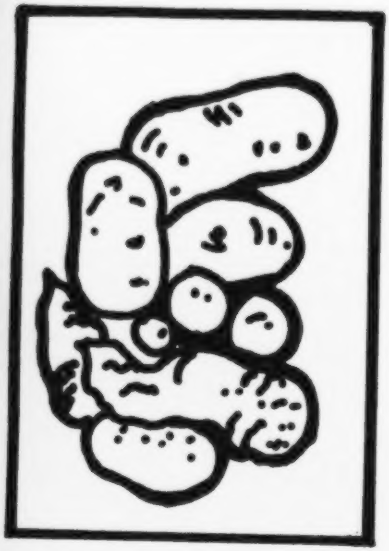
Nursery Crops - Large population centers, Long Island, Florida

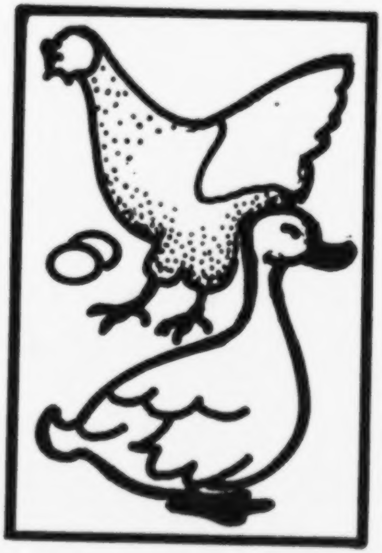
Grapes - near bodies of water - New York, California primarily

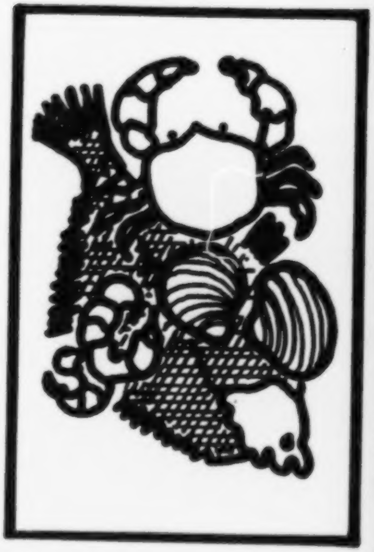
Horses - Kentucky, New York including Long Island, Texas, Montana, California

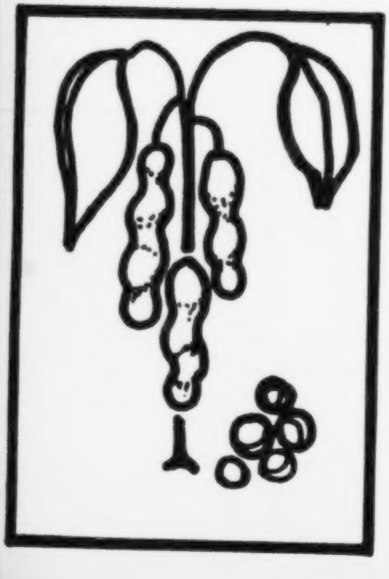
Flowers - Long Island, California, Florida, and near large population centers

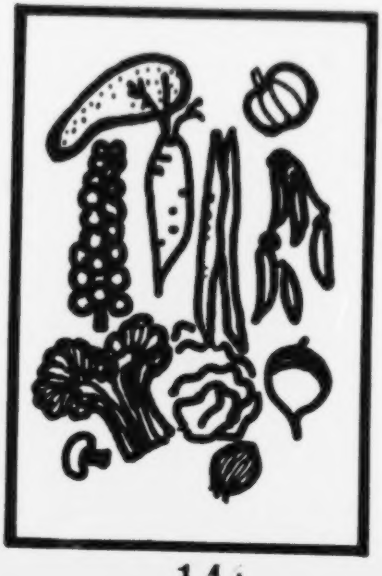







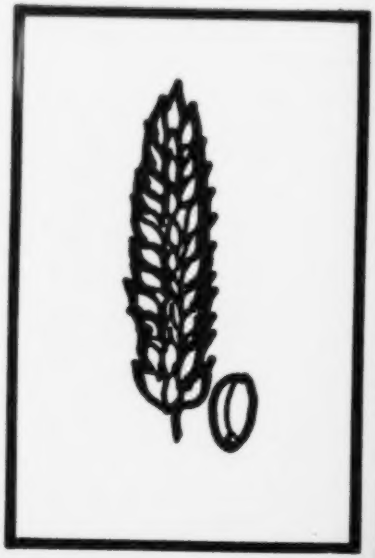


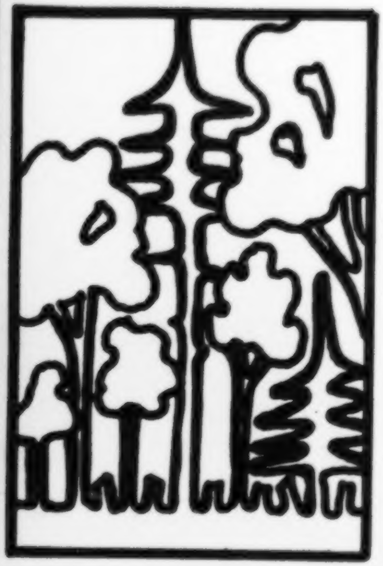


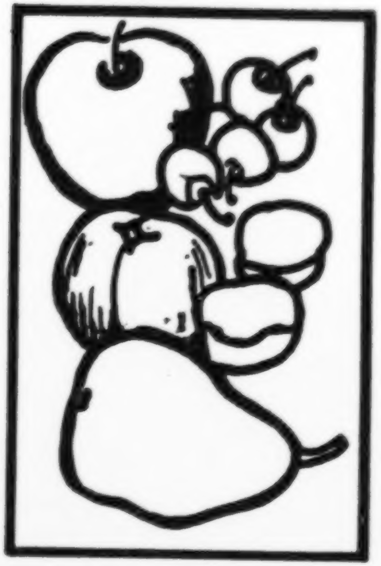


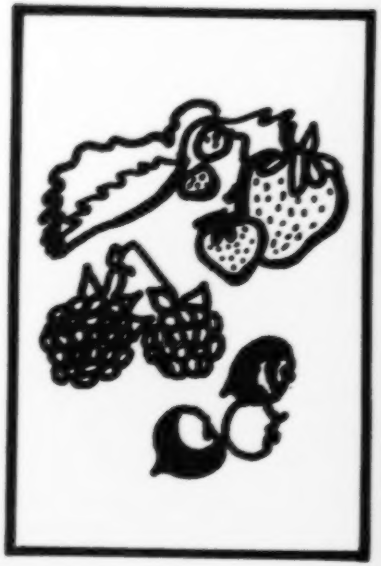


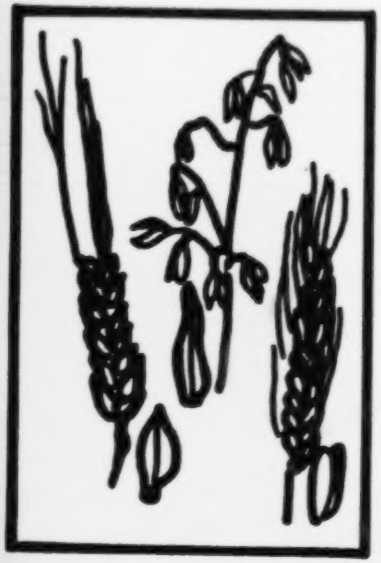


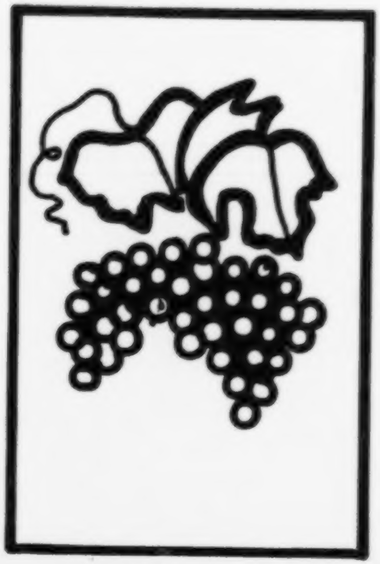


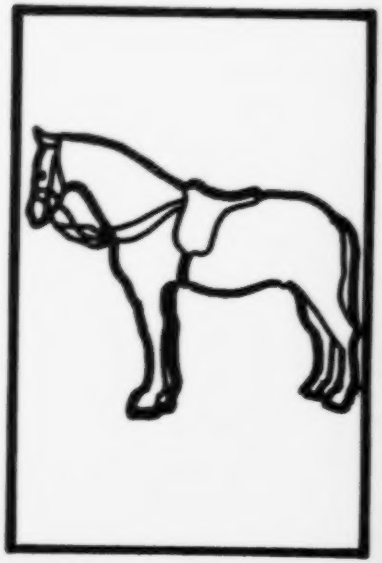


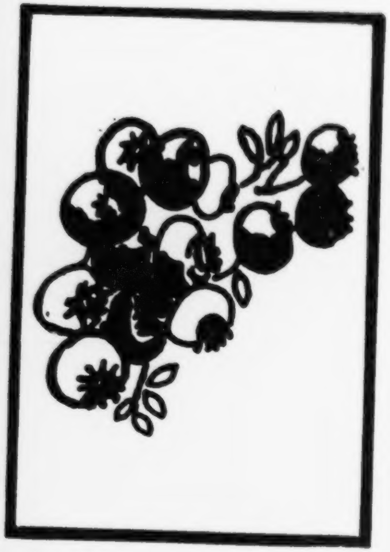


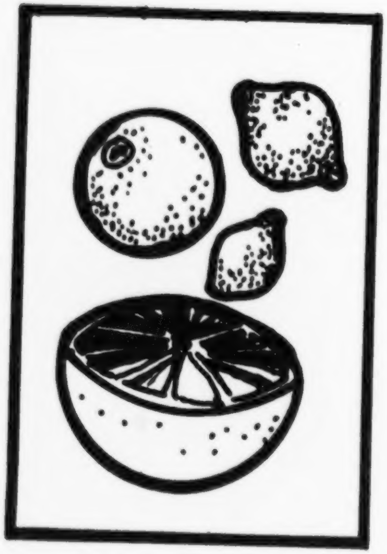


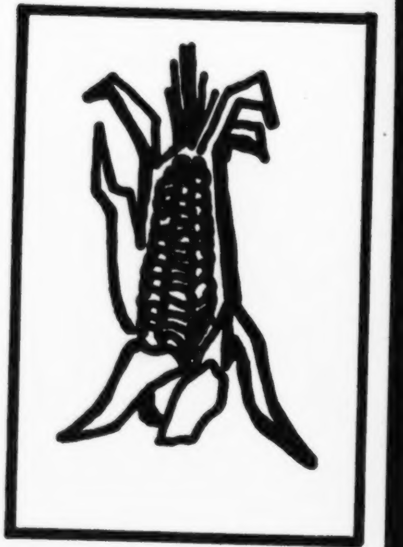


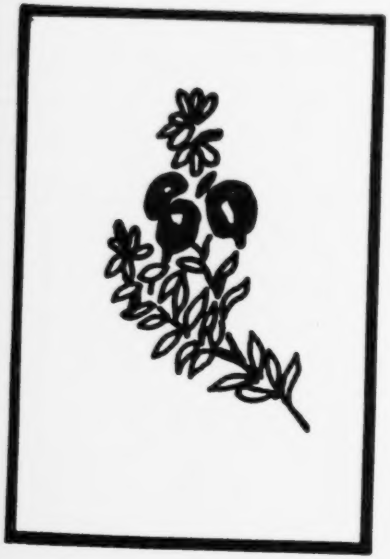


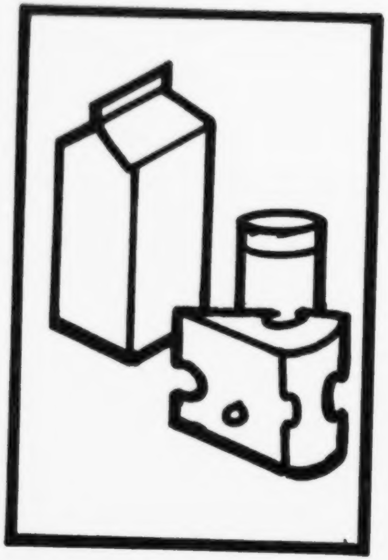


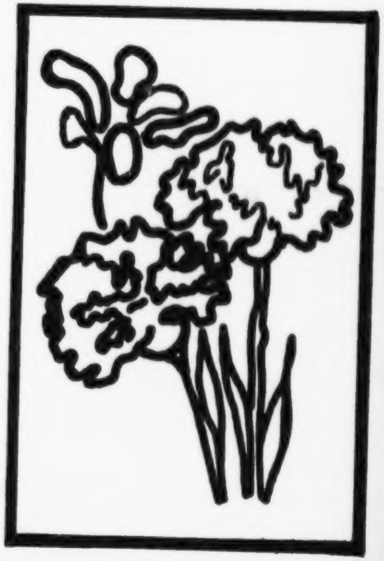


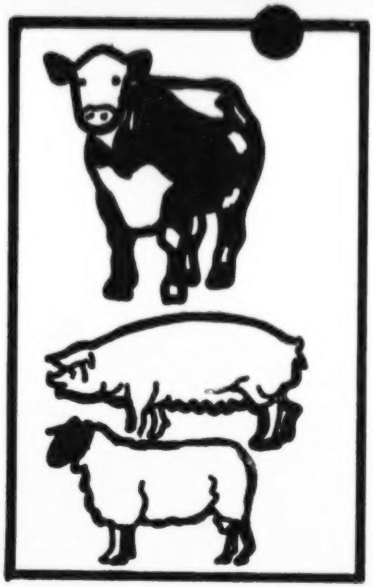


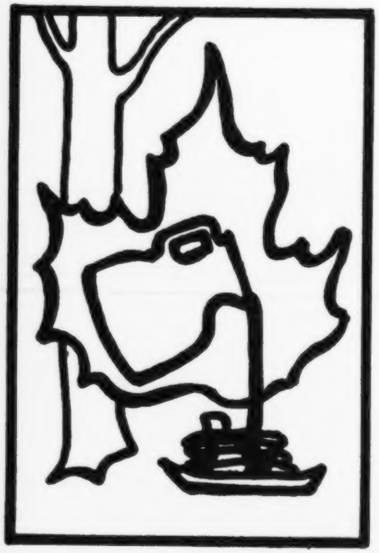


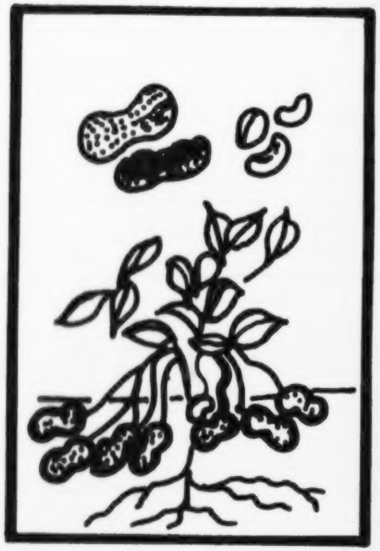


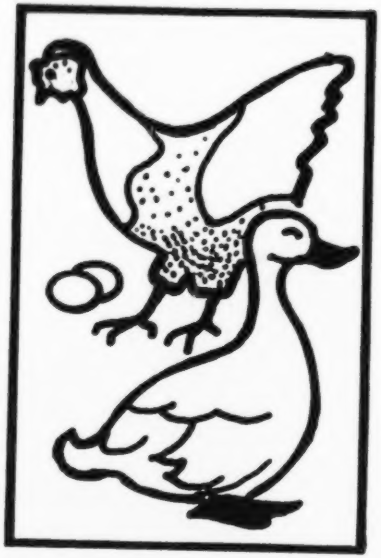


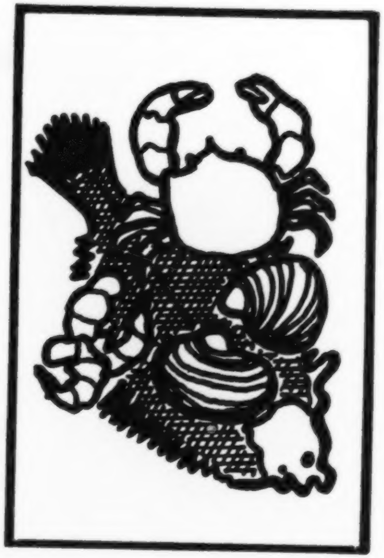


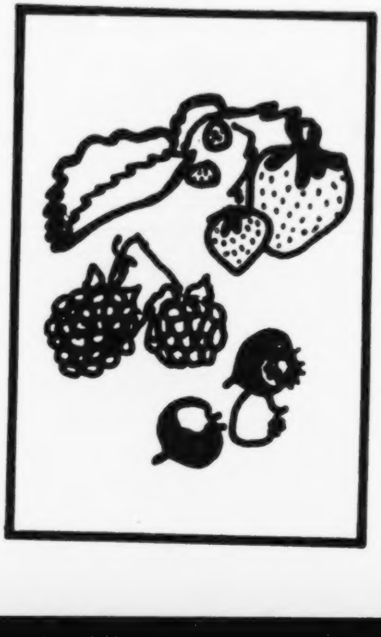


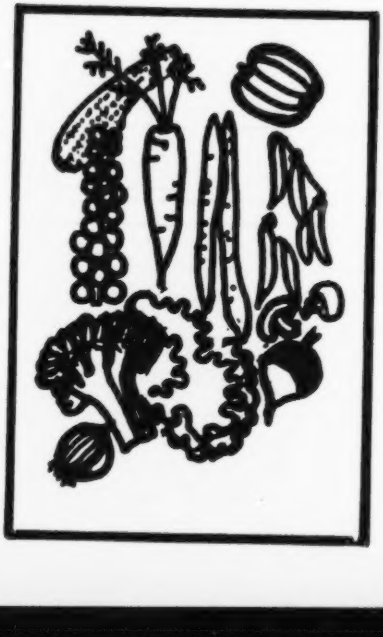












Social Studies
- interdependence

CONCEPT: Social Studies - interdependence
(economics pages 52, 58, 60)
- scarcity
(economics pages 46, 50, 54)

OBJECTIVE: The students will identify products which New York exports or are exported through New York.

BACKGROUND: Much of the wealth of our production agriculture is shared with the rest of the world. The exact amount varies with the economy. But agricultural exports are a significant percentage of the GNP of the U.S.

ACTIVITIES:

1. Have the students read pages 32 and 33 in *New York's Big Apple*.

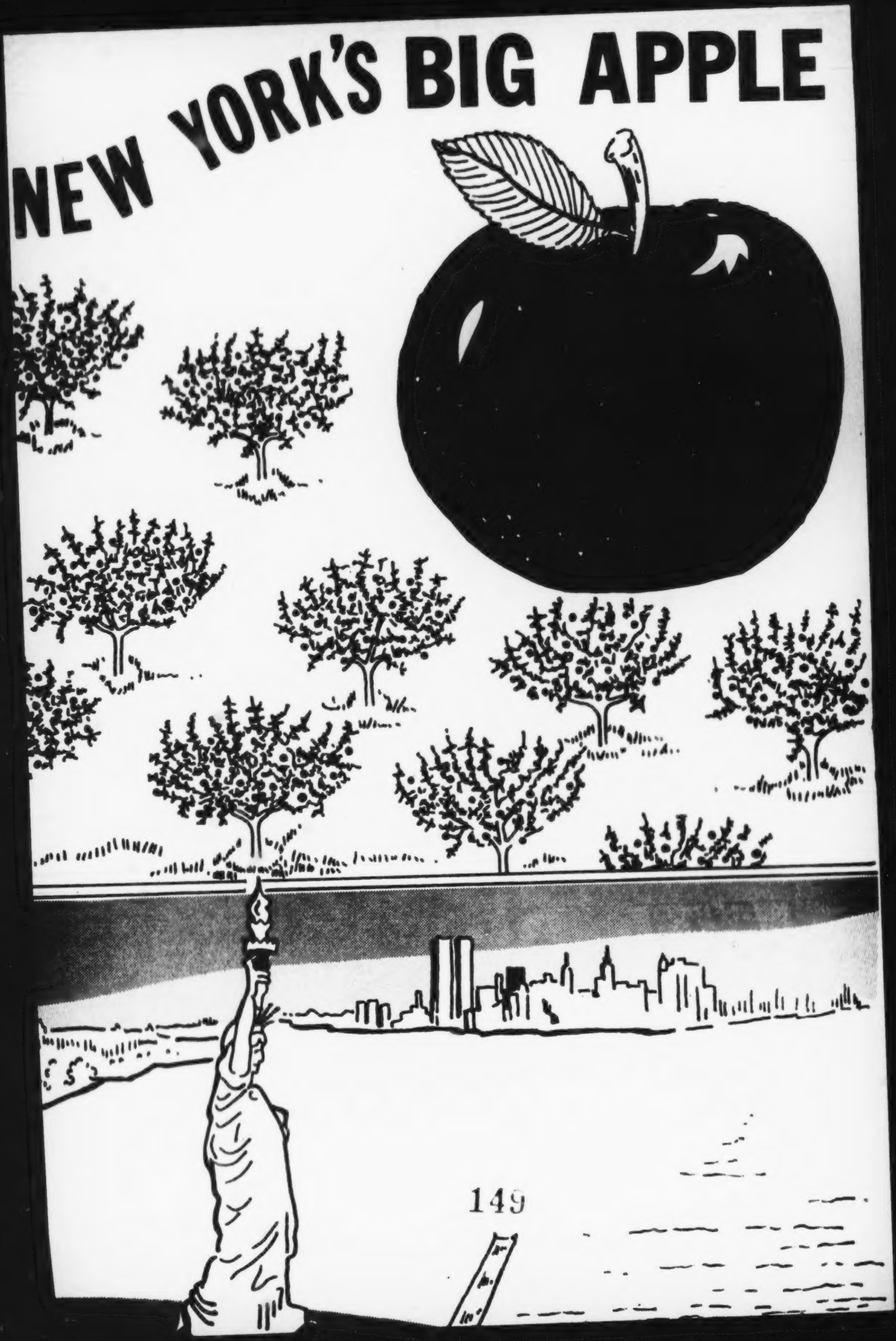
2. Make copies of the export list.

3. Have the students draw colored lines from New York to the various countries on the map. Each color should represent a different commodity. For example, use a red line for beef. New York exports midwestern beef through its ports. A red line should begin in the midwest travel to New York and then Japan.

4. The process can be reversed. Have the students determine what comes into New York from the rest of the world. (Look on their clothing labels, T.V.s, automobiles, imported cheese, etc.).

EXPORTED FROM NEW YORK

Wine	Japan Yugoslavia
Blue Jeans (made from Southern cotton)	Europe
Cheese	Mexico South America Europe
Processed apples	Europe South America
Corn (from the Midwest)	Europe Russia Africa
Wheat (from the Midwest)	Europe Africa Russia
Dairy cattle	South America Africa
Agriculturists	World-wide
Nursery stock	Europe
Dry beans	Mexico South America
Beef (from the Midwest)	Japan
Baby Food (from New York fruits and vegetables)	World-wide
Lifesavers (from sugar produced in California, Florida, Hawaii, Minnesota, Idaho, Louisiana, Texas, and North Dakota)	World-wide


NEW YORK'S BIG APPLE

New York's Big Apple was written by Betty Wolanyk with contributions from Colleen Blissard and Maria Jasper.

New York's Big Apple was illustrated by Mary Brenner, Patti Harrington-Keagle, Marilyn Luke, Jethro Abplanalp-Gaede, and Marian Van Soest. Typesetting was done by Janet St. Pierre. The graphic design was by Mary Brenner.

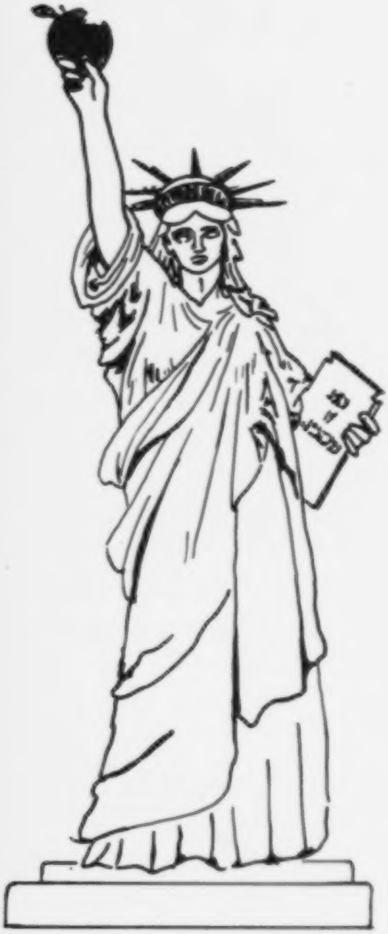
Contents

New York's Big Apple.............................. 3
Without Agriculture................................ 4
Complex Cotton.. 6
Farm Products.. 9
Grape Juice.. 10
Did you Know?.. 11
Life is a Pretzel.. 12
Food from the Sea.................................... 14
The Honey Bee.. 16
Agricultural Regions of the United States.............................. 18
Agriculturists.. 20
America's Foods and Fibers................. 22
Indian Words.. 28
Agricultural ABC's.................................... 30
New York's Exports.................................. 32
Rebuild the Empire.................................. 34

New York Agriculture in the Classroom is a joint effort of the New York Farm Bureau, Inc., New York State College of Agriculture and Life Sciences, New York State Department of Agriculture and Markets, and New York State Education Department, under the direction of Daryle Foster, Director of Instructional Materials Service, Department of Education, Cornell University, and Bill Unscheid, program specialist, 4-H Youth Development, Cornell Cooperative Extension.

New York State College of Agriculture and Life Sciences, is an equal opportunity, affirmative action educator and employer. New York's Big Apple was published and distributed by New York Agriculture in the Classroom, 24 Roberts Hall, Cornell University, Ithaca, N.Y. 14853-5901, 1987.

NEW YORK'S BIG APPLE



Everyone across this country takes a bite out of "New York's Big Apple".

New York City has the nickname of "The Big Apple". New York State also has a very large apple industry. But, let's use "New York's Big Apple" as a symbol. Let's say that New York's Big Apple is agriculture. Agriculture is the big apple of opportunity for New York.

We take a bite out of this apple when we use food and fiber produced or processed in New York, or services provided by New York companies. We each take another bite when we use products that travel into and out of our ports.

Each one of us uses New York's products because New York City is a world center for trade and commerce. For example, an advertisement for a combine (built in Illinois) could be created by a Madison Avenue advertising firm in New York City.

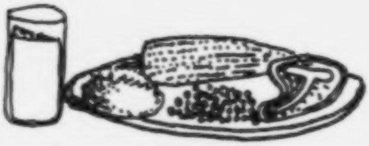
This is all a part of our food and fiber system today. Come along and take your bite out of "New York's Big Apple".

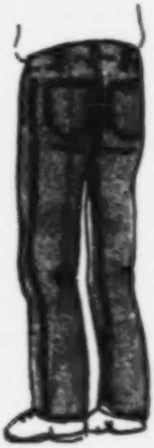
WITHOUT AGRICULTURE:

Agriculture is important to everyone! Without it we would have

no houses,

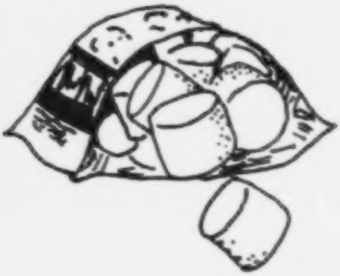
no food,

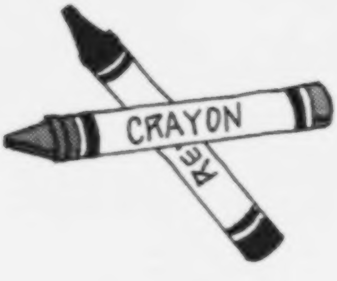




no denim jeans,

no marshmallows,



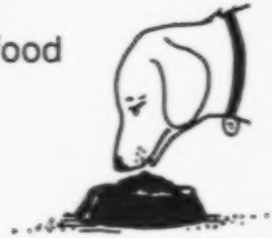


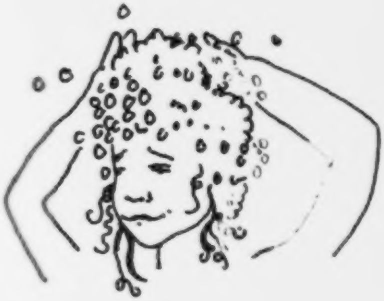
and even crayons
would be scarce!

AGRICULTURE IS BIGGER THAN YOU THINK!

Are you aware of all the products which come from agriculture? When a doctor gives you medicine there is a very good chance that it was made from an agricultural product. Insulin, for example, is a by-product of beef and swine. When you take a bite out of New York's Big Apple it may be by using a product that you don't realize agriculture produces. When you use

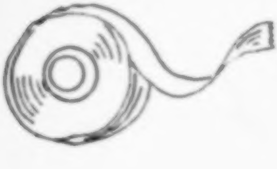
pet food





shampoo

cellophane



or felt

take time to consider that it may have come from agriculture.

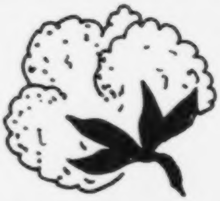
Many of the products that are used in New York are from agricultural products of our state. But many of the products come from other states or even other countries.

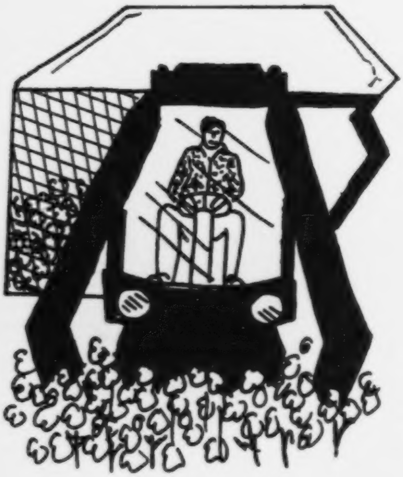
Some products that are processed in New York are brought in from other states, made into a finished product and then sent to another state or country for retailing.

COMPLEX COTTON

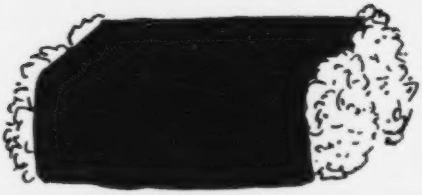
Have you ever thought how your cotton shirt or a pair of blue jeans is made? Well, it is quite a story. Cotton plants are grown in warm climates. In the United States, most of our cotton is grown in the south, from Virginia to California.

Cotton plants produce fluffy fruits known as "bolls" which contain fiber and seeds. The cotton is harvested by machine.





It is then cleaned to remove burrs, sticks and dirt. Then it is ginned. Ginning removes the seeds from the fiber. The seed will be used later. The fiber is put into large bundles called bales.



Each bale weighs almost 500 pounds. The baled cotton is sold to a textile company where it is processed into cloth. From one bale of cotton 300 pairs of denim jeans or 800 cotton shirts can be made. The baled cotton is sold to a textile company where it is processed into cloth.

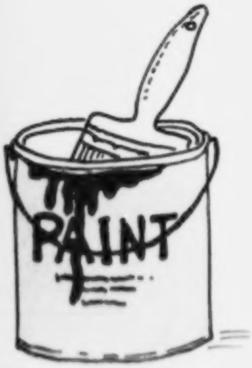
There are four main steps to manufacturing cloth.

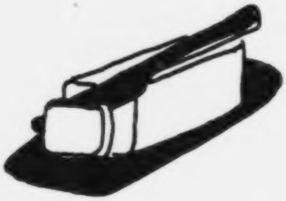
1. producing yarn (thread) from the fiber.
2. weaving or knitting the yarn to make cloth.
3. bleaching and dyeing
4. finishing

Finishing the cloth can make it wrinkle resistant, water repellant, or flame retardant.

Now the Big Apple comes into the picture! New York City has a huge clothing industry! It is a world famous center for textiles, designers and garment production. Your bite of New York's Big Apple today might be the clothing you are wearing.

That part of the story is complicated enough. But, there is more to the story. · Let's go back to the cotton seeds. The seeds are crushed to get the oils. The cottonseeed oil is used in margarine, shortening, paint, and even soap.





Now, take a look at the clothes worn by your classmates. Are they all made of cotton? Are they the same style? They are not, are they? In the past all clothes were made of natural fibers, such as: wool, cotton, silk and leather. Today, much of our clothing is "Man-made". Some of the man-made fibers also depend on agriculture but, that's another story.

How do you think man-made fibers affect the cotton industry? What happens to the farmer if cotton can't be sold for a profit? What happens to the textile mills and the workers? It is still not the end of the story.

What about style? When you looked around at your classmates you saw different styles.

If you were wearing clothes from 100 years ago you would feel funny. Even if your clothes were ten years old you would probably feel out of place. Styles change every year. We are right at the Big Apple again!

What effect does changing style have on New York's clothing industry? Do you think that style changes sell more clothing than if the style remained the same? Are clothes more practical today than in the last century? Do style changes serve a purpose or just sell clothing? How does all of this affect the cotton industry?

Well, you can see how complicated our story becomes when we begin to think of the relationship of agriculture to the economy, industry, changing times and our culture. If you work in an agricultural job in the future you will need to be aware of how your job is affected by many outside factors. Who thought agriculture was simple?

FARM PRODUCTS

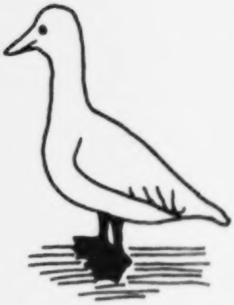
Draw a line from the product that is produced on the farm to the product that you can buy in a store. There may be two store products for some of the farm products.

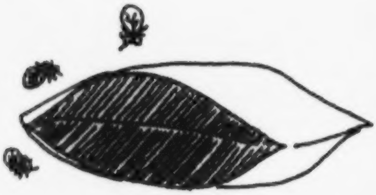
Farm Product

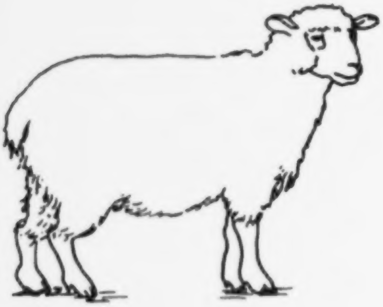
- Cows
- Wheat
- Cabbage
- Steers
- Chickens
- Sheep
- Ducks
- Swine
- Cotton

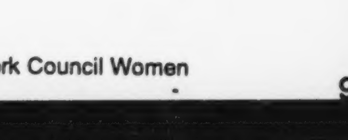
Store Product

- Pillow down
- Ham
- Cloth
- Paint brush bristles
- Cheese
- Beef
- Yarn
- Flour
- Milk
- Mutton
- Sauerkraut
- Eggs
- Wool







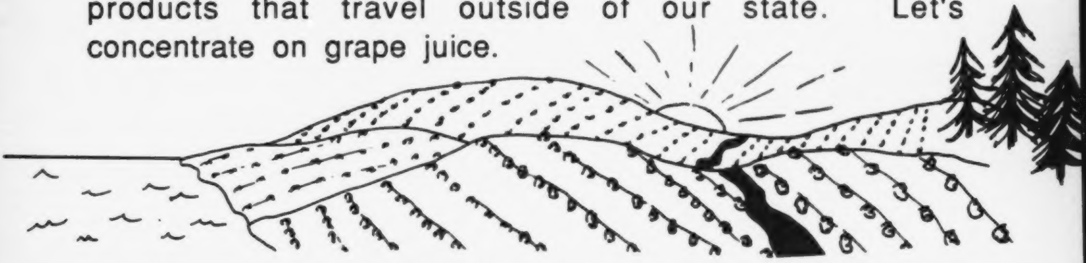


Adapted from New York Division of the National Pork Council Women

GRAPE JUICE

Grapes are grown on vines in vineyards across New York State as well as other parts of the country. It may seem strange to include grapes as part of New York's Big Apple but, remember we are discussing agriculture.

Growing grapes in vineyards is known as production. Grapes produced in New York are used for many products. Grape juice, jelly, table grapes and wine are New York products that travel outside of our state. Let's concentrate on grape juice.



Grapes grow in bunches. The bunches can either be picked by hand or a machine. Grapes for juice or wine are usually picked by machine. They are then transported by truck to a processing plant.

GRAPE JUICE

At the processing plant, the grapes are washed and the juice is squeezed out of the grapes by a machine. The juice is filtered to improve the quality, put in containers and then heated to kill germs.

Heating the juice in sealed containers is called pasteurization. It is similar to pasteurizing milk. The juice is then distributed to stores, schools and restaurants which sell it to the consumer.

DID YOU KNOW?

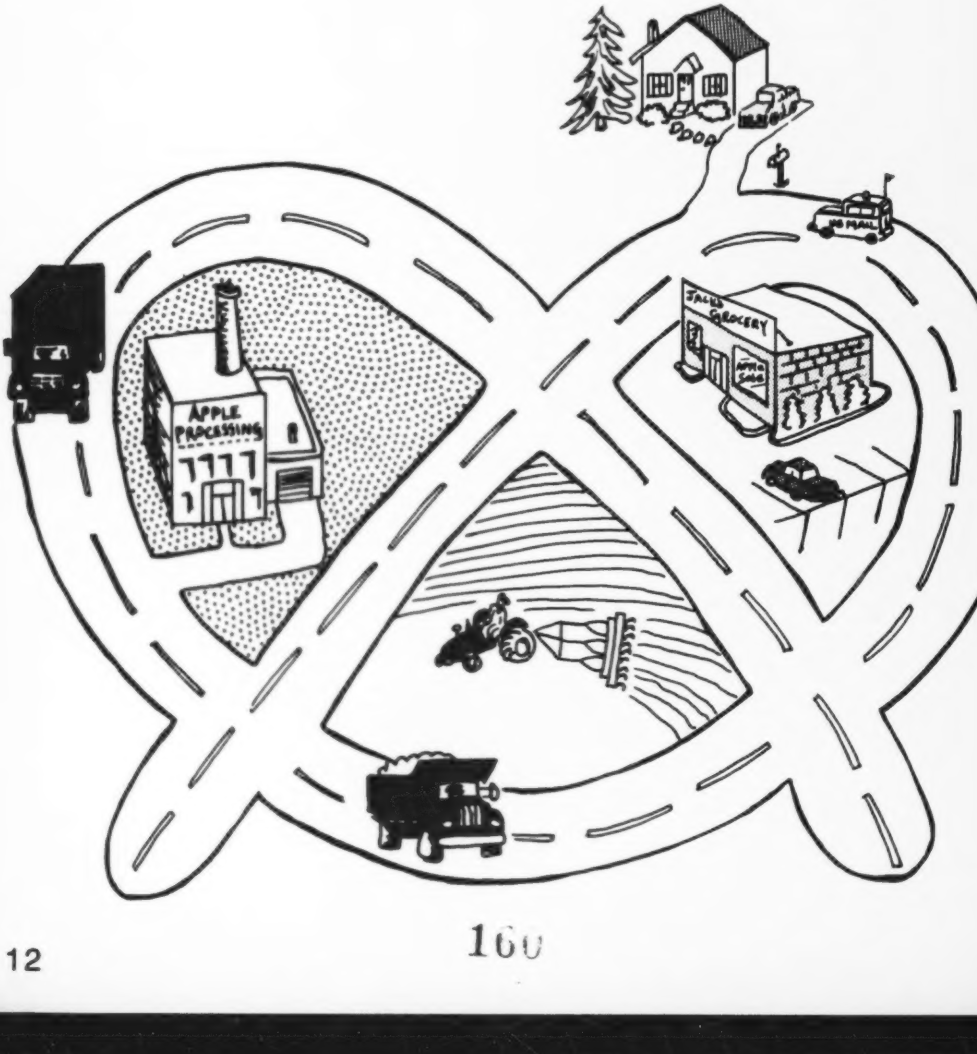
Did you know these fascinating facts about agriculture? You do now!

- Farming began over 12,000 years ago!
- In the 1700's, one U.S. farmer could feed 3 people. Today that farmer feeds over 116.
- One out of every 4 people in the U.S. works in agriculture.
- New York State is #2 in the U.S. in number of cows.
- The average cow produces 62 glasses of milk a day (so drink up!).
- There are more chickens in the world than there are people.
- Condensed milk was developed in Brooklyn, N.Y. in 1851.
- Water is the most important food there is for both people and animals.
- The Soviet Union produces more wheat than any other country.
- It takes about $6\,{}^{1}/_{2}$ years before an orange tree starts producing oranges.
- The U.S. leads the world in corn production.
- A cow belches 50 liters of gas a day.
- Cucumbers, string beans, walnuts and tomatoes are really fruits.
- Suffolk County, Long Island is New York's leading agricultural county.

LIFE IS A PRETZEL

People in all walks of life influence each other and depend upon each other. Those who make their living in some part of agriculture have an effect on everyone else.

For example, all sorts of machines are used in agriculture. They are made largely of metals. The metal for these machines is provided by miners who take the ore from the ground and by the mills that turn ore into a form of metal we can use. If people did not produce metals for machines, farmers would be back in the stone age! And if farmers and other people did not buy metal, miners would be out of work!



Families who make their living from agriculture also go to schools, churches, movies and restaurants. They buy clothes and cars and TV's and computers. They pay taxes to support road building, public education, research and social programs. The money spent by people in agriculture helps support many businesses.

Joe's father is a truck driver. Tom's father is a miner who helps produce the metal for the truck. Jack's mother works in the shop where the trucks are repaired. Sue's family owns the dairy farm where Joe's father picks up milk in his truck. Mike's mother gives piano lessons to Jack. Mike drinks milk with his meals that was produced on Sue's dairy farm. Amy's mother is the banker who loaned money to Joe's father for the truck and Sue's family for the farm. Rob's mother is a scientist who specialized in improving fertilizers used on the corn which is fed to the cows on Sue's dairy farm. Heather's' dad is a teacher at the school where Joe, Tom, Jack, Sue, Mike, Amy, Rob and Heather all go to school.

I'll bet you can think of some more twists to this pretzel!

FOOD FROM THE SEA

Long Island has over 1,000 miles of coastline, including numerous bays, inlets, Long Island Sound and the Atlantic Ocean. Fish and shellfish are caught almost year round.

Long Island seafoods are sold within hours of being caught. Find these Long Island seafoods in the puzzle :

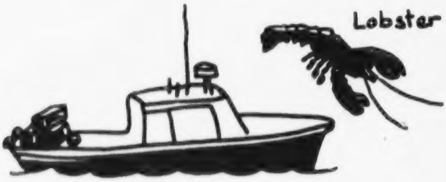
BAYS

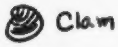
Hard Clams
Soft Clams
Mussels
Oysters
Lobsters
Hard Crabs
Bay Scallops
Conch

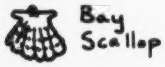
OCEAN AND SOUND

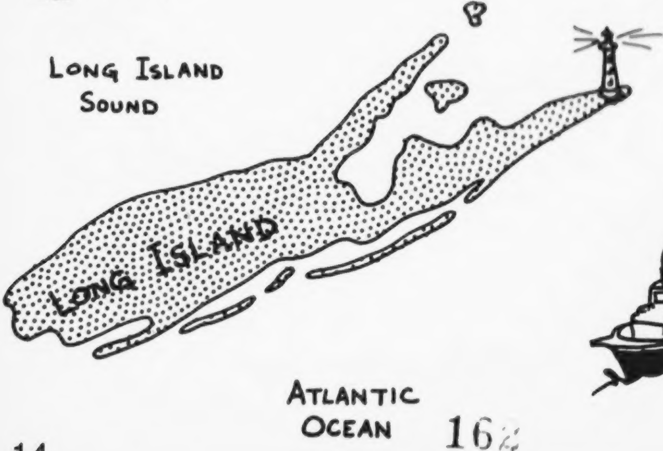
Bluefish
Weakfish
Striped Bass
Lobster
Flounder
Fluke
Blackfish

Sea Bass
Porgies
Squid
Eel
Blowfish
Swordfish
Mako Shark



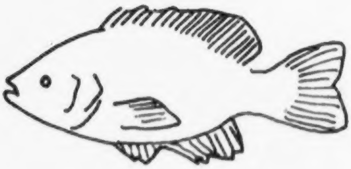


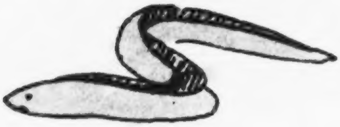

Bay
Scallop


LONG ISLAND SOUND
LONG ISLAND
ATLANTIC OCEAN

Atlantic Cod

M	X	T	S	B	L	A	C	K	F	I	S	H	F	D	Y	S	Q
A	S	P	O	A	L	K	R	T	W	A	T	C	X	B	H	N	R
K	S	G	B	Y	N	H	T	E	H	A	R	D	C	L	A	M	S
O	V	O	Y	S	T	E	R	S	N	L	I	M	O	O	W	U	Q
S	O	F	T	C	L	A	M	S	S	X	P	U	N	W	E	J	U
H	F	S	T	A	S	L	K	B	T	O	E	S	C	F	A	O	I
A	A	S	B	L	U	E	F	I	S	H	D	S	H	I	K	F	D
R	Q	E	E	L	T	Y	B	J	D	Y	B	E	H	S	F	K	F
K	W	E	W	O	T	R	J	G	B	V	A	L	D	H	I	U	L
P	I	R	T	P	O	R	G	I	E	S	S	S	V	C	S	I	U
A	I	E	O	S	E	A	B	A	S	S	S	U	P	N	H	T	K
F	L	O	U	N	D	E	R	H	A	R	D	C	R	A	B	S	E
A	S	L	O	B	S	T	E	R	S	W	O	R	D	F	I	S	H

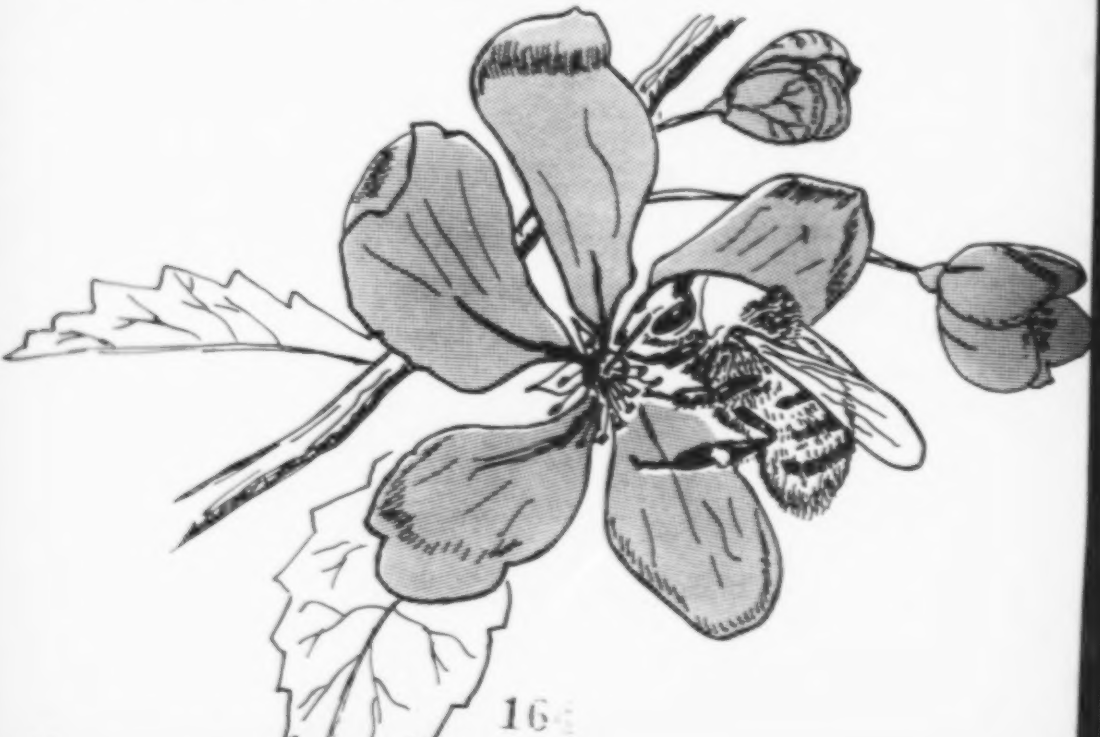


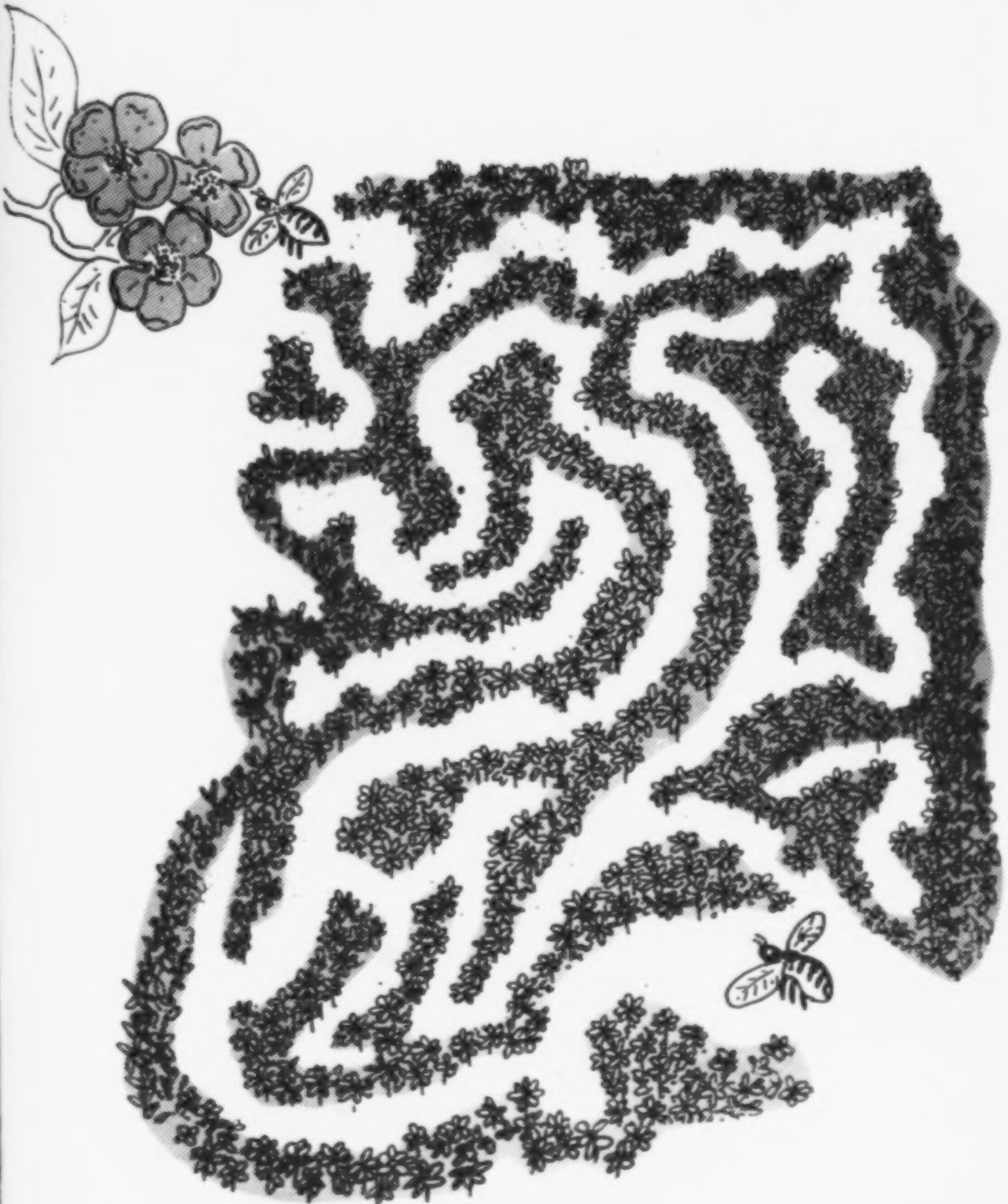


Information provided by the Long Island Farm Bureau

THE HONEYBEE

The Honey Bee makes its place in New York's Big Apple by pollinating. New York's apple industry depends on it. If the spring is too cold the bees do not travel about collecing nectar and the trees do not get pollinated. This little bee lives in the bee hive with many other honeybees. Everyday, it flies out to gather sweet juices from the flowers. This is called nectar. As the bee goes from flower to flower it picks up a yellow dust on its feet. This dust is known as pollen. When it travels between flowers it spreads the pollen around. Apple trees must be cross-pollinated this way. The bee then carries the nectar back to its beehive and makes honey. Show this little bee the way to the flower.

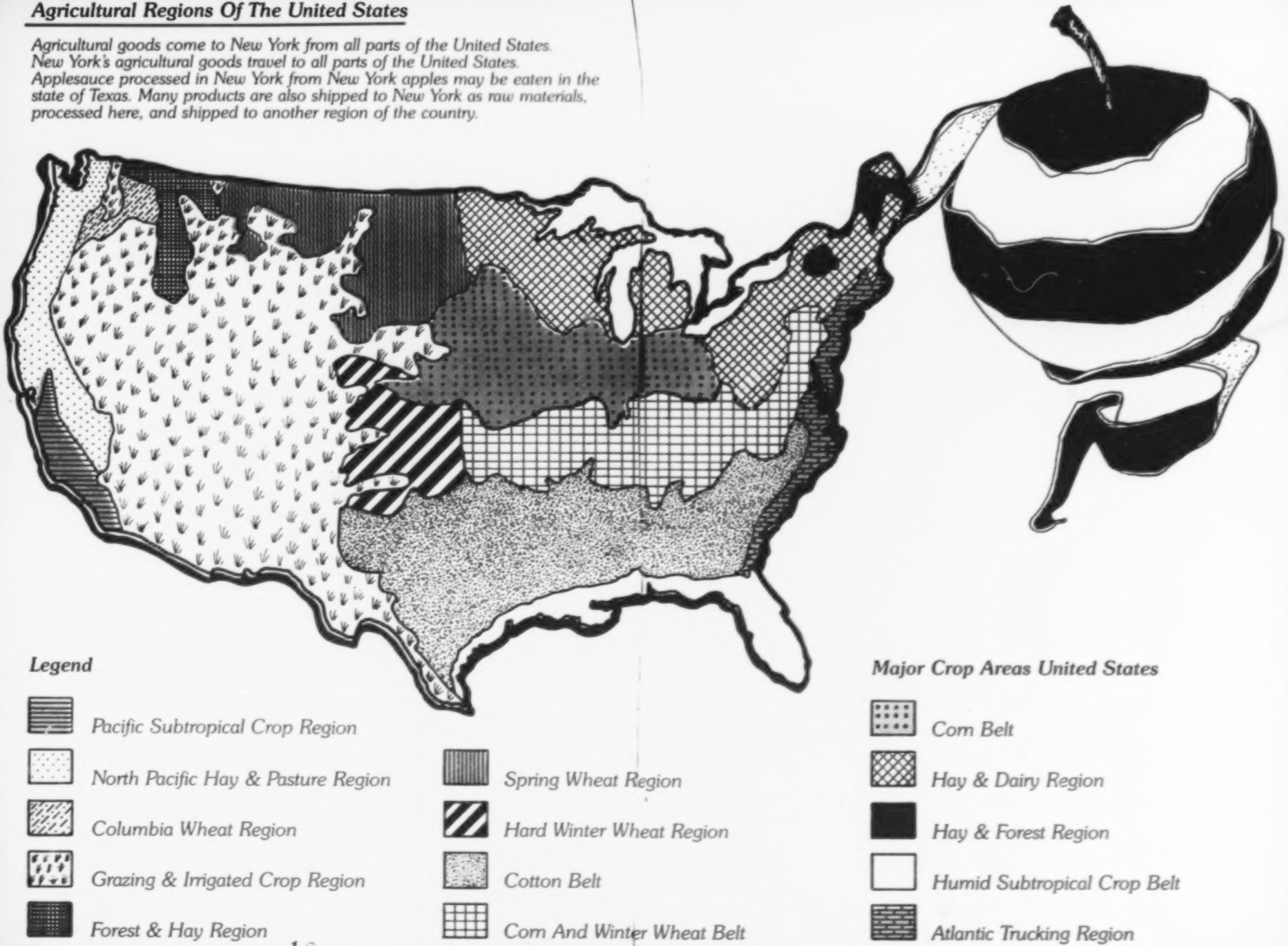




Adapted from the Long Island Farm Bureau

Agricultural Regions Of The United States

Agricultural goods come to New York from all parts of the United States. New York's agricultural goods travel to all parts of the United States. Applesauce processed in New York from New York apples may be eaten in the state of Texas. Many products are also shipped to New York as raw materials, processed here, and shipped to another region of the country.

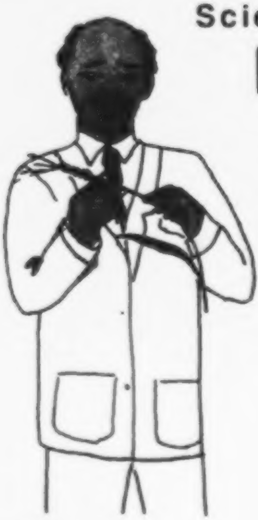

Legend
Pacific Subtropical Crop Region
North Pacific Hay & Pasture Region
Columbia Wheat Region
Grazing & Irrigated Crop Region
Forest & Hay Region
Spring Wheat Region
Hard Winter Wheat Region
Cotton Belt
Corn And Winter Wheat Belt
Major Crop Areas United States
Corn Belt
Hay & Dairy Region
Hay & Forest Region
Humid Subtropical Crop Belt
Atlantic Trucking Region

AGRICULTURISTS

Place a check mark in the box next to the people who are agriculturists.

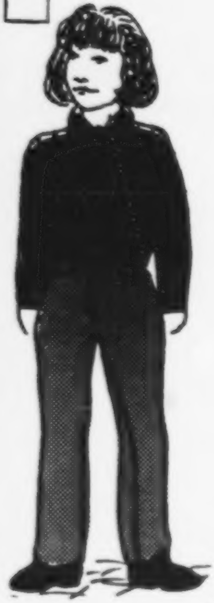
Scientist

☐



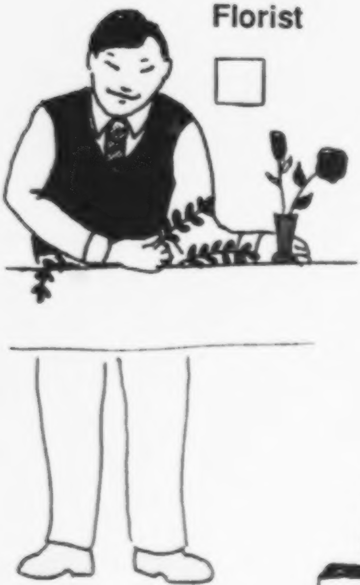
Dairy Farm Manager

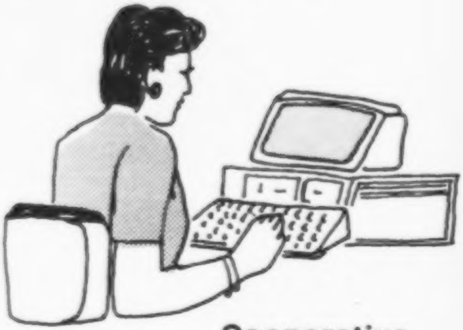
☐



Florist

☐

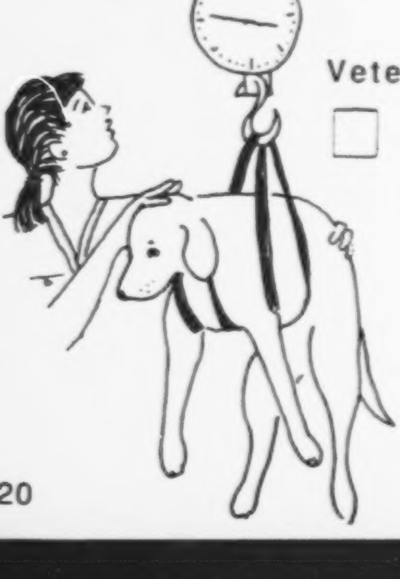


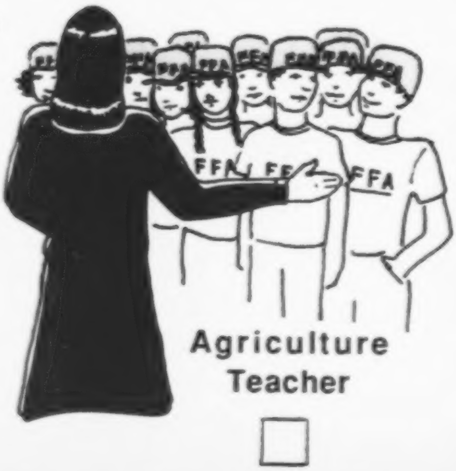


☐ **Cooperative Extension Agent**

Veterinarian

☐

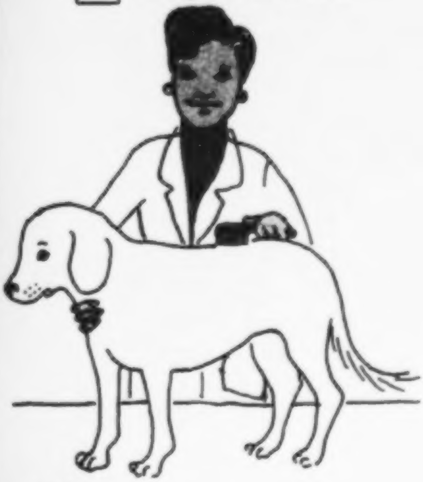




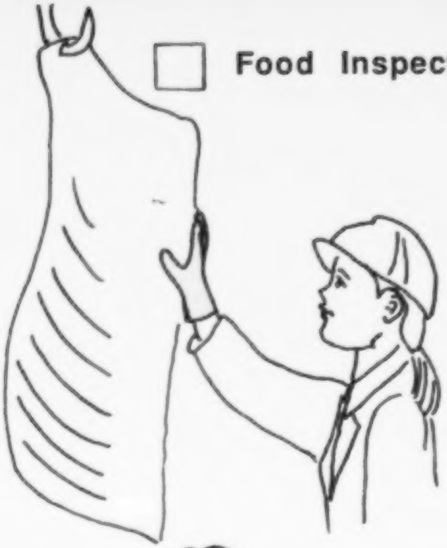
Agriculture Teacher

☐

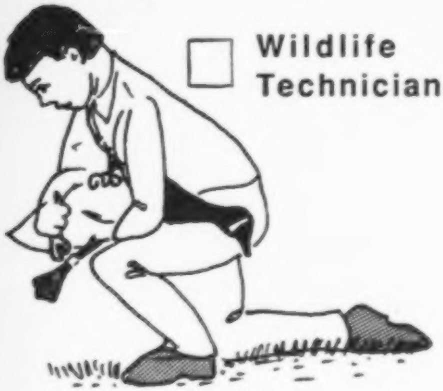
☐ **Dog Groomer**



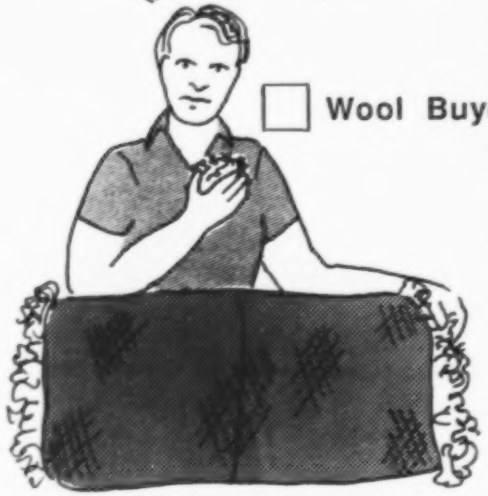
☐ **Food Inspector**



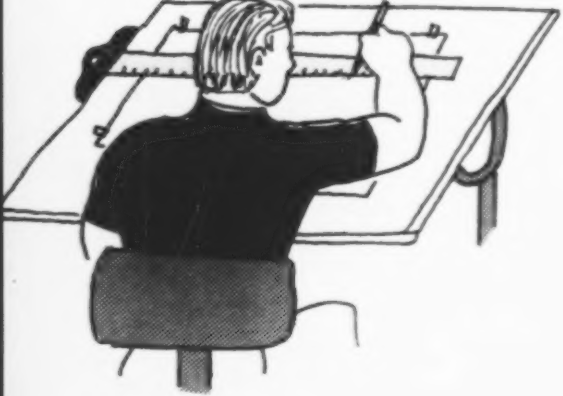
☐ **Wildlife Technician**



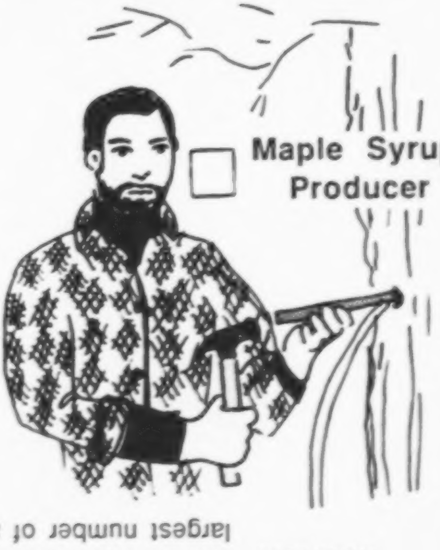
☐ **Wool Buyer**



☐ **Landscape Architect**



☐ **Maple Syrup Producer**



Answer: All of them are agriculturists! New York has the second largest number of agricultural workers in the United States.

AMERICA'S FOODS AND FIBERS

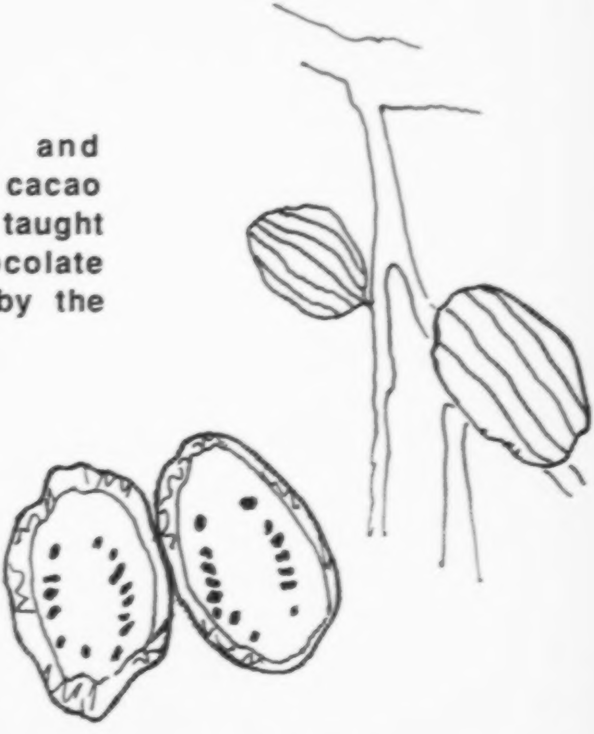
People have been taking a bite out of New York's Big Apple for a long time! In fact you could say that the American Indian was taking a bite out of New York's Big Apple even before it really existed. How can that be?

Well, the Indians were not only hunters, farmers and fishermen, but also traders. Many of the new foods and fibers the colonists found in this area were brought here by trading. Corn began in South America or Central America. It was developed from wild plants by the Indians. Tobacco came from southern areas of America and was traded or used as a form of money. Many other new foods and fibers came to New York by the Indians in the same way.

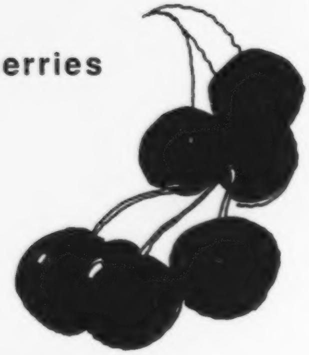
What foods and fibers came from America?

Cacao

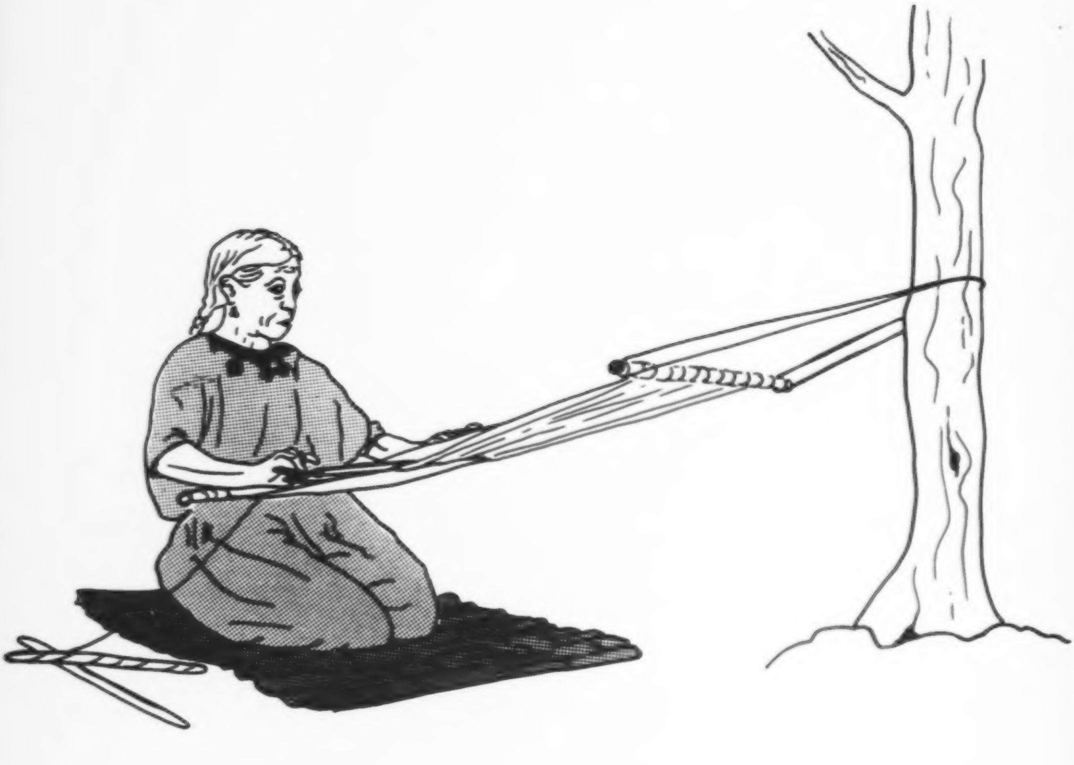
We make cocoa and chocolate from the cacao plant as the Indians taught the colonists. Chocolate was called chocolate by the Aztec's.



Cherries

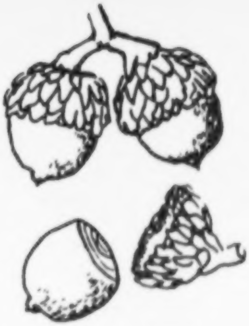


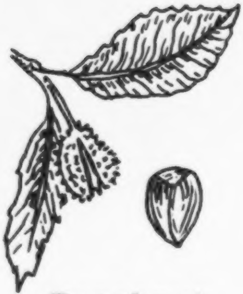
Cotton

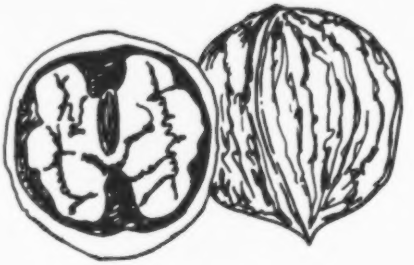


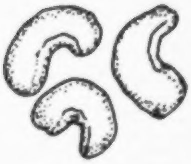
Gherkins

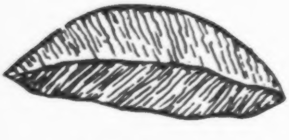
Nuts

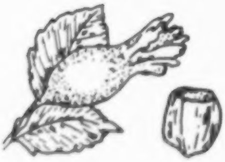

Acorns

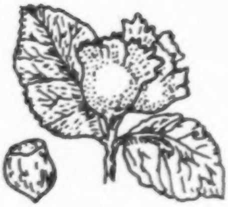

Beechnut

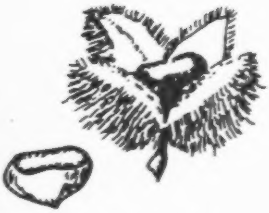

Black Walnut

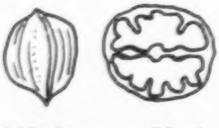

Cashews

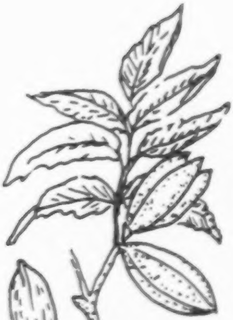

Brazil Nut


Filbert

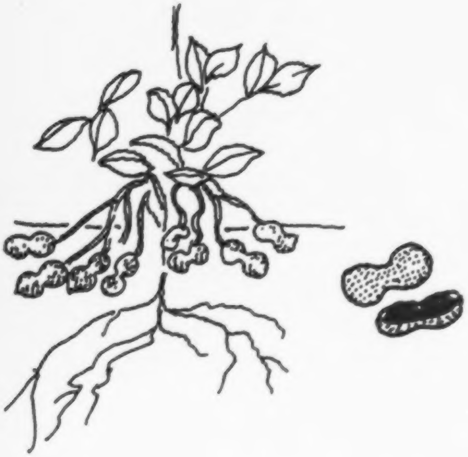

Hazel Nut


Chestnut

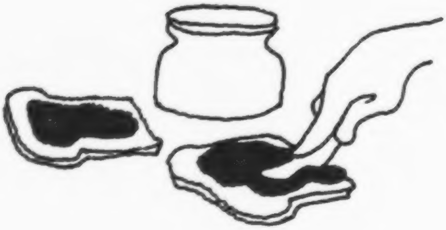

Hickory Nut


Pecan

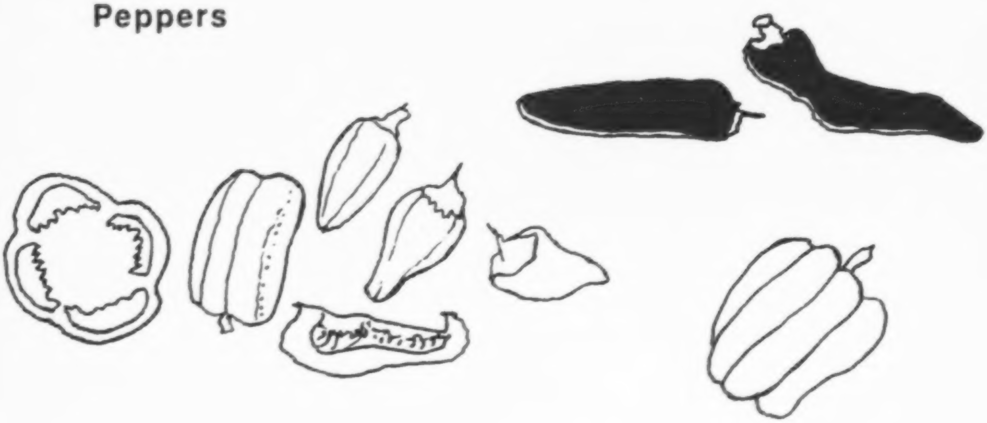
Peanuts



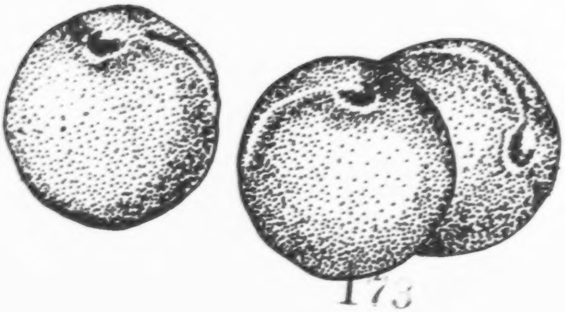
and even
Peanut Butter



Peppers

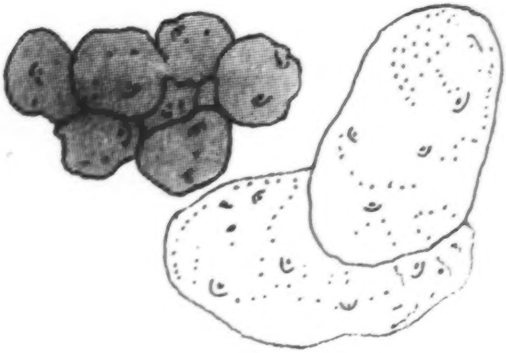


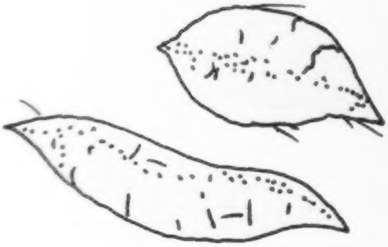
Plums

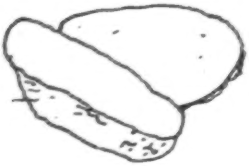


Potatoes

Sweet potatoes &
white potatoes

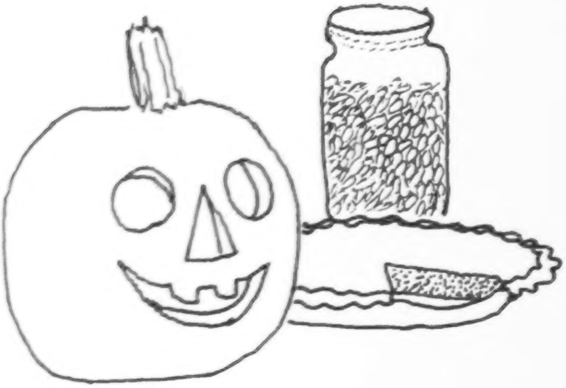




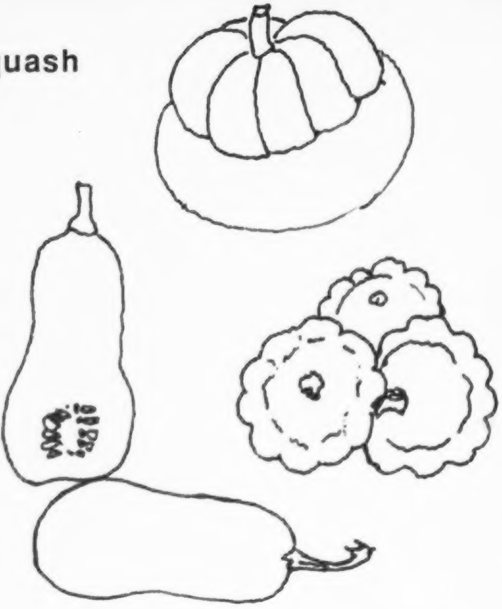


The explorers added papa to batata to make the word potato.

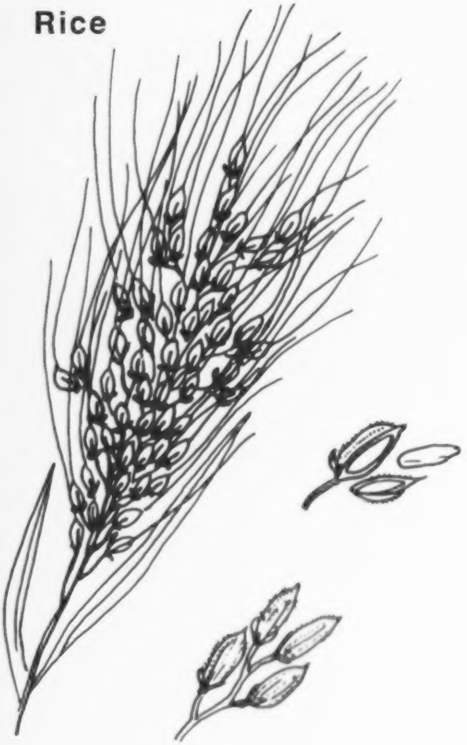
Pumpkins



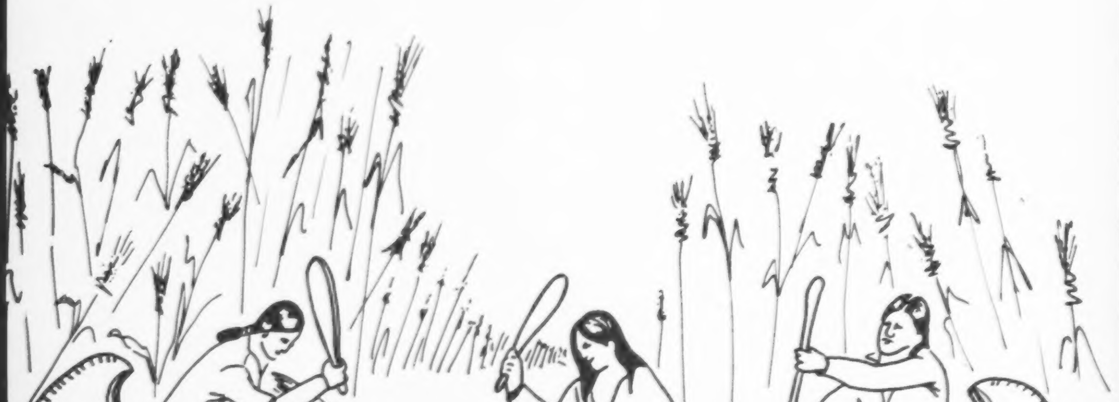
Squash



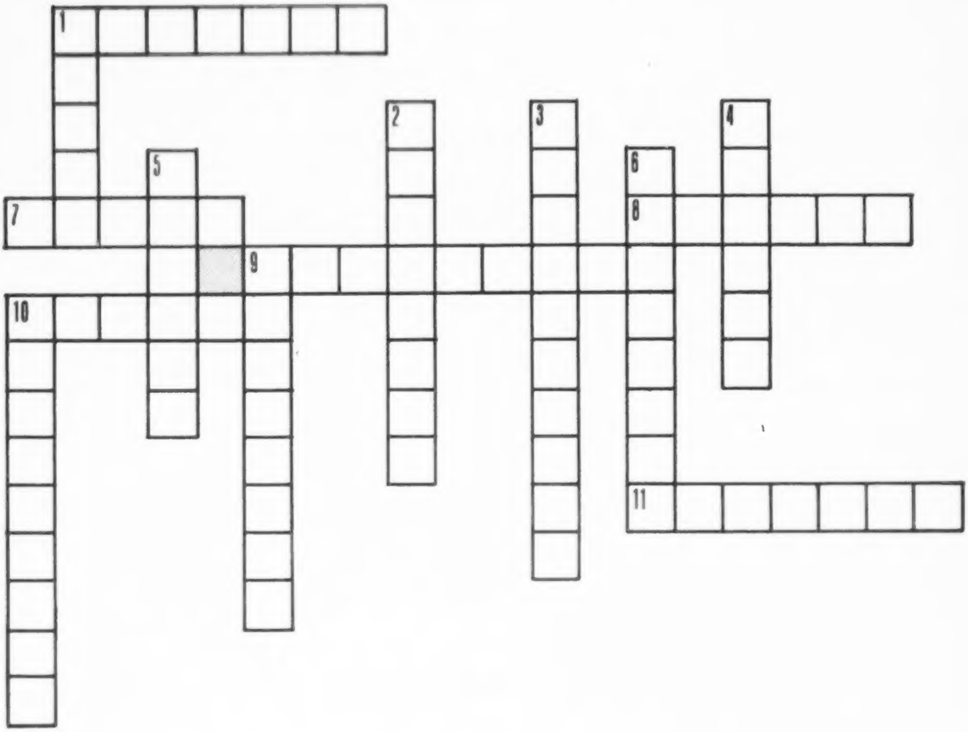
Rice



The Indians called it asquash.



INDIAN WORDS THAT ARE NOW A PART OF OUR LANGUAGE



Use these words to fill in the crossword puzzle:

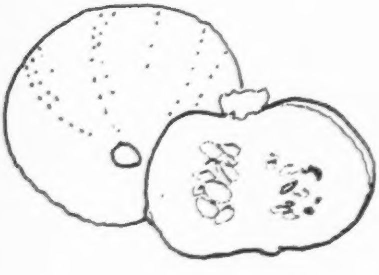
CANOE
CHICAGO
CHIPMUNK
CHOCOLATE
COCOA
GHERKINS
HOMINY
LIMA-BEANS
MOCCASIN
POTATO
SEATTLE
SQUASH
SUCCOTASH
TOMATO

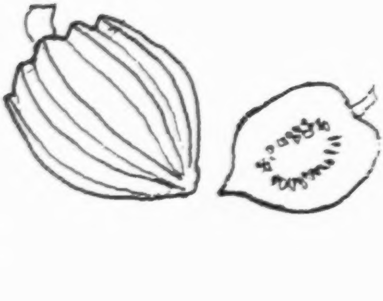
Across

1. Checago is now a midwestern city
7. Boat built by Indians
8. Corn dish the Indians made
9. Cacao is the correct
10. Vegetable the Indians called asquash
11. Washington state city

Down

1. Indians called it chocolatl.
2. Indian shoe
3. Beans found in succotash
4. They were called name tomatl by the Mayans.
5. Explorers added papa and batata to get this.
6. Small pickle named after a chief.
9. Alvin is a ________
10. Lima beans + corn =





AGRICULTURE IN NEW YORK'S BIG APPLE MEANS:

AGRICULTURAL ABC'S

A for Apples
Animals
Aquaculture

B for Beef
Beekeeping
Butchering
Blueberries
Beets
Breeding
Beans
Bedding Plants
Budding
Building

C for Corn
Cutting
Cheese
Computers
Cabbage
Cherries

D for Deer
Drainage
Degree- Days
Digging
Dogs

E for Energy
Eggplant
Eggs

F for Felt
Fisheries
Forestry
Fur
Flowers

G for Grapes
Greenhouses
Grain
Goats
Grazing
Growing
Grafting

H for Horses
Honey
History
Hens
High-Tech

I for Ice Cream
Indians
Insulin
Irrigation
Industry

J for Jobs
Journalism
Jelly

K for Knowledge
Kennels
Kittens

L for Life
Lobster
Lillies
Landscaping

M for Milk
Management
Mechanics
Milking

N for Nursury Stock
Nightcrawlers
Nuts

O for Ornamentals
Onions
Oats
Oil

P is for Popcorn
Potatoes
Pears
Peaches
Peas
Phloem
Planting
Pruning

Q for Quail
Quarter Horses
Quality
Quantity

R for Real Estate
Research
Rhubarb
Ranching
Ripening

S for Swine
Sheep
Soil Conservation
Science
Surveying

T for Tourism
Turkeys
Terracing
Trees

U for Unit-pricing
Uniformity
Universal

V for Vegetables
Vetch
Variety
Veterinarians
Veal

W for Wine
Water
Wildlife
Weeding

X for Xylem
Xenogamy
Xylose
X-chromosome
Xanthophyll
X-mas trees

Y for Yearlings
Yams
Young
Y-chromosome

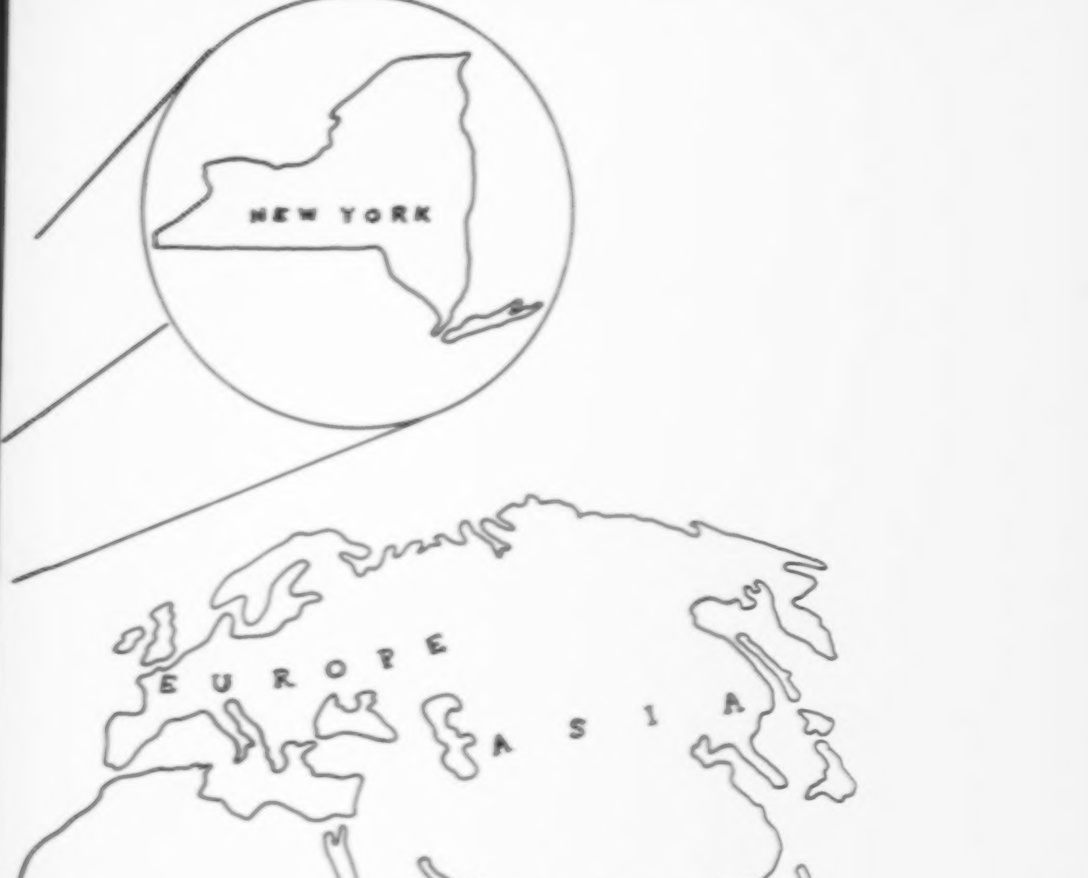
Z for Zucchini
Zoos
Zinnia

NEW YORK'S EXPORTS

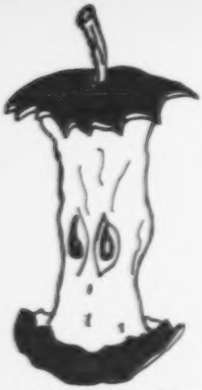
The whole world takes a bite out of New York's Big Apple. Our products travel world wide. Shipping goods from New York's ports to other countries is called exporting.

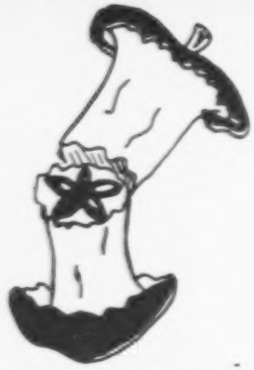
NORTH AMERICA
ATLANTIC OCEAN
PACIFIC OCEAN
SOUTH AMERICA

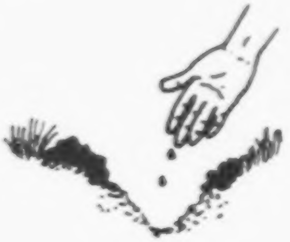
150

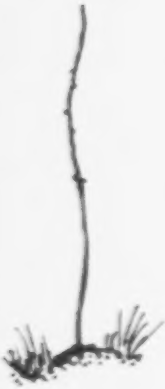

NEW YORK
EUROPE
ASIA
AFRICA
INDIAN
OCEAN
AUSTRALIA

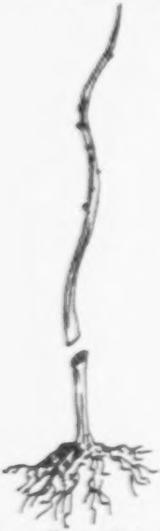
REBUILD THE EMPIRE

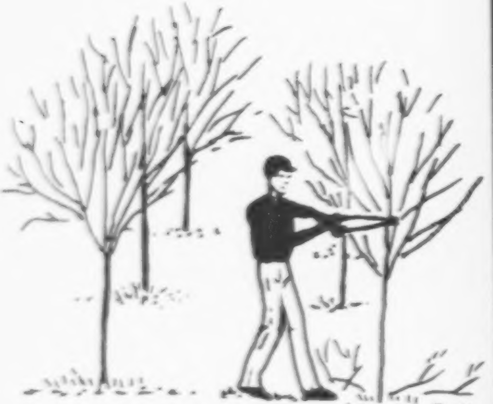

1. Apple Core

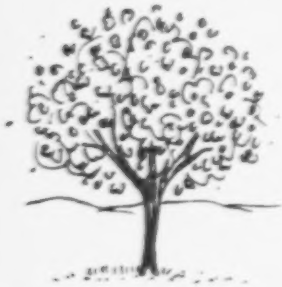

2. Seeds Inside

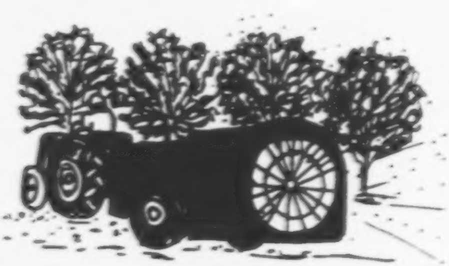

3. Planting

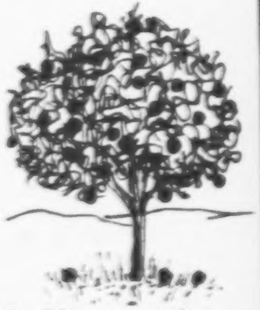

5. Young Tree


6. Grafting

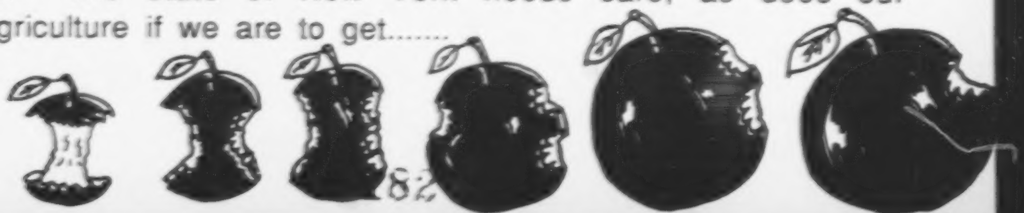

7. Pruning

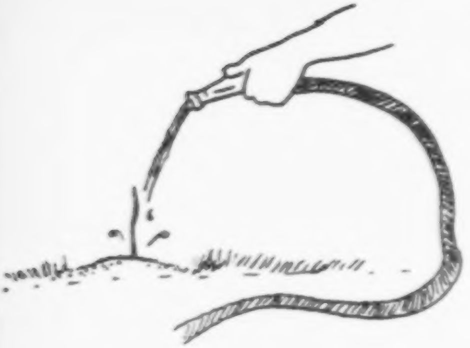

9. Blossoming


10. Spraying

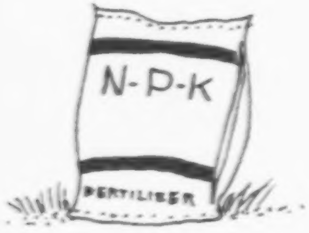

11. Harvesting

We cannot just bite New York's Big Apple. We must nurture it too. Our industries, soils, cities and environment need care. Whatever we take out is only as good as what we put in. The state of New York needs care, as does our agriculture if we are to get.......





4. Watering



8. Fertilizing

12. The Empire Apple

Please fill in this form, tear it off, and give it to your teacher.

1) Did you enjoy reading this booklet?

________ yes ________ no

2) What section did you like best?

____

3) What section would you like to learn more about?

____

4) Do you understand more about agriculture after reading this booklet?

________ yes ________ no

If yes, please describe what:

____

____

____

5) Did you like the puzzles?

________ yes ________ no

6) What is New York's Big Apple?

____

ENERGIZE The GREEN MACHINE

"It looks cloudy over eastern North America tonight. I wonder if it's raining on my hometown. In the last message they beamed up, my parents said it was dry. ...Which reminds me, have you checked the filter on the hydroponic system lately? We had some trouble with it during the last day-shift." He turns from the window-port with the ease afforded by near-zero gravity.

You look up from the CRT screen in front of you, where you have been reading the wire service news being beamed up from earth. "The filter is fine. I checked it a couple of hours ago. But, the lighting bank needed adjustment. Some of the carrots and beans were looking a bit scraggly — not enough intensity. I turned it up."

The Green Machine

You could be one of these people growing plants in a space station miles above the surface of the earth. Or, you might be an engineer who designs the plant-growing module of the space station, or a molecular geneticist or plant breeder tailor-making plants to grow well in low gravity, or a food scientist designing packaging for space-grown produce.

Here on earth, plants are "green machines" which capture, package, and store energy from the sun through photosynthesis. Plants supply food and fiber which sustain life. But, these "green machines" also need human energy to help them become more effective producers in the "green machine" that is our food and natural resource system.

The "green machine" needs your energy in:

- Science and Engineering
- Business and Financial Management
- Production
- Natural Resource Management
- Communications

SCIENTISTS AND ENGINEERS

In our food and natural resources system, scientists and engineers work on projects as diverse as genetic engineering of food crops, designing robotic harvesting equipment, studying the nutrient content of food, or helping a community use its water supply wisely.

Futurists predict that during the next quarter century the most important scientific discoveries in genetic engineering will be made by food and agricultural scientists. As a genetic engineer, you might improve the production power of plants and animals or make them better able to resist diseases and pests, and to grow in unfavorable climates.

Nutritionists and food scientists study the links between food, diet, and health. As one of them, you might work to assure that new convenience foods are nutritious and healthy. Or, you might design a new way of preserving, processing, or packaging food.

Of all the water consumed in the United States, our food and agricultural system uses over 80 percent. As a soil and water scientist you would be challenged to provide enough quality water for food producers and consumers, while conserving natural resources for future food production.

Computer-controlled growth environments, robots that harvest crops, gene transfers which make plants resistant to disease, and laser-guided machinery are discoveries of food and agricultural scientists and engineers. If you chose to join them, what might you invent, design, or discover...a space station food production system, perhaps?

BUSINESS AND FINANCIAL MANAGERS $

Food is big business. The U.S. food system contributes more than $625 billion each year — or 20 percent — to our gross national product. You could be one of the managers and financial specialists who direct that large volume of business.

As a financial manager you might work for a bank or a credit agency as an agricultural loan officer, or for a company which sells supplies to producers and growers. As a credit manager, loan officer, or financial analyst, you could spend your days evaluating potential business investments. As a marketing specialist you may develop sales strategies for firms which turn crops and animals from the farm into food for consumers. In any case, you would need to combine expertise in food production, processing, and distribution with business skills.

The U.S. accounts for nearly one-fifth of the world's agricultural trade. Economists, international trade experts, marketing managers, and brokers are main links in the chain of people responsible for the movement of forest and agricultural goods. As one of these professionals, you would need not only to understand economic and cultural differences between countries, but also the special characteristics of different food, agricultural, and forest products.

Many companies look for people who want to work in food processing, manufacturing, and distribution. Other positions as sales and technical service representatives are open to persons who would like to [illegible] with products to farmers and ranchers.

PRODUCERS

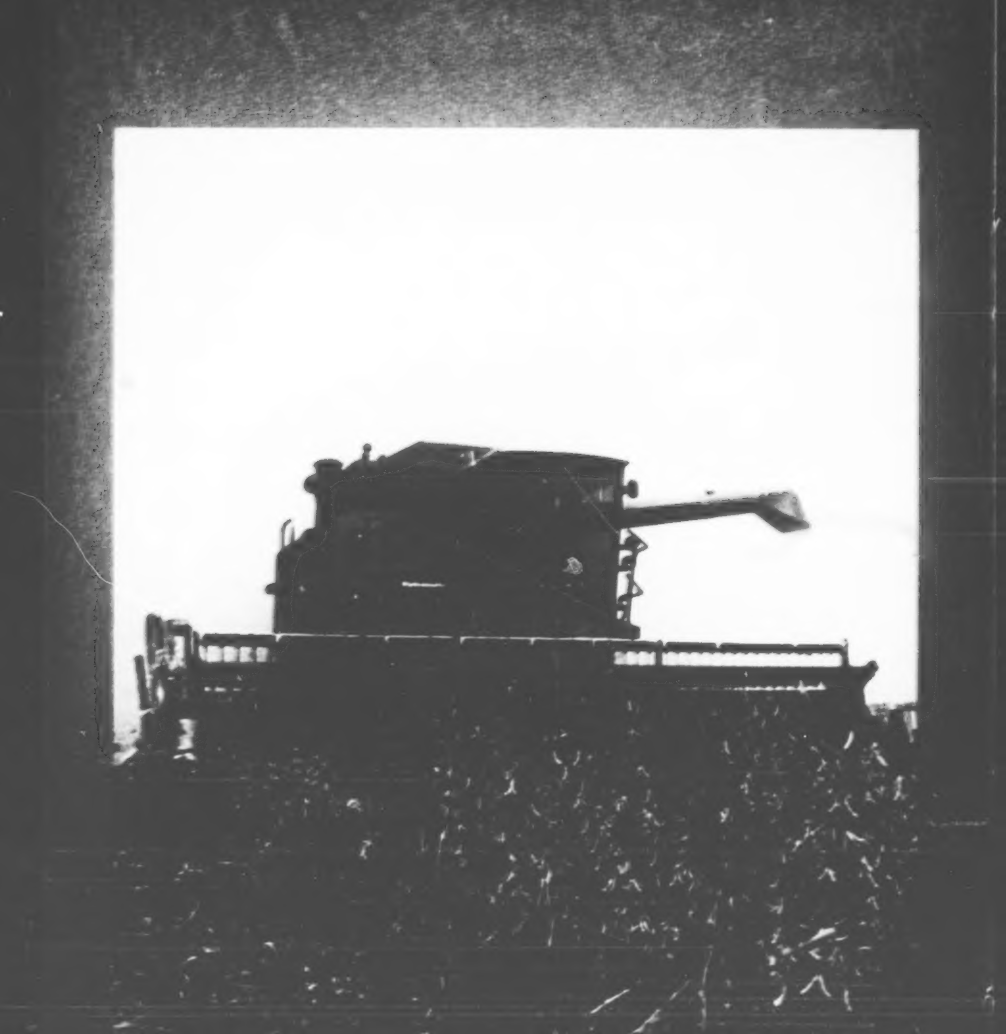
Three million farmers, ranchers, timber producers, and other growers are the foundation upon which the U.S. food and agricultural system rests and will be the center of our food system in the future. They will grow the plants and animals we need for good health as our lifestyles change.

Probably fewer future farms and ranches will be managed by owner-operators. Many expect that investors will more often own land, buildings, and equipment. Market contracts, production specifications, trade agreements, and other business transactions will be important to future producers. They will hire college-educated farm managers, ranch managers, and production supervisors to run their operations. Yet, family farmers and ranchers will continue to be important food producers in the coming years.

If you plan to become a producer, you will need an education in science, business, and production technology. Also, you should help operate a farm or ranch to get valuable experience.

Controlled environments, genetically engineered plants and animals, intelligent computers and robots will be part of the future farm and ranch landscape. You will need to understand world markets, changing consumer food and fiber preferences, and the effects of farming practices on maintaining productive soil and quality air and water.

And, it's just possible that, as a future producer, you may need to understand the effects of weightlessness and artificial growing conditions on plants — in case you "farm" in space.



COMMUNICATION SPECIALISTS

Like all parts of our world touched by science and technology, the food, agricultural, and natural resources system is changing rapidly. Because it contributes to and is strongly influenced by world trade and consumer lifestyles, the system must adjust continually. Someone, a communication specialist, must interpret these changes and communicate them to other people.

You might be the information or education specialist who works with the foresters, scientists, engineers, or other professionals, or who reads the scientific and technical journals, then translates the information into easily understood language.

You might produce or host radio or television shows, write news or feature articles for magazines or newspapers, or develop consumer information for private businesses. You might teach classes in high school or college. You could be a nutrition counselor for a health clinic or nursing home, or an exhibit manager for a science museum.

In any case, you will need to stay informed of changes and new discoveries in diet, fitness, health, consumer preferences, food production, and much, much more.

The tools of your trade will include computers, satellite uplinks, laser disks and videotapes, radio and television, magazines and newspapers. They might also include laser-beamed wire service messages to those space station farms high above the planet.

NATURAL RESOURCE MANAGERS

You could become a natural resource manager who cares for our nation's renewable resources: water, soil, forests, and rangelands.

As a forester or range manager you could direct the production and use of forests, rangelands, and related renewable natural resources. It would be your job to manage these resources to provide a continuing supply of wood and paper products, animal products including wildlife, and outdoor recreation opportunities.

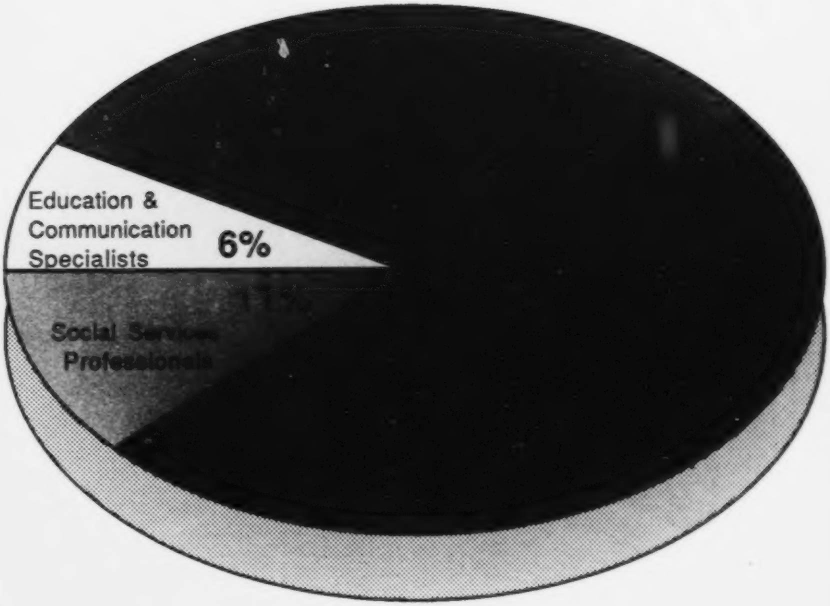
You might work for a regulatory agency. Such agencies monitor the air and water quality of a food production system, analyze the environmental impact of proposed changes in land use, or handle hazardous waste disposal.

As a soil scientist, you may develop new techniques to conserve soil resources and teach producers to use them. Or, you may work in desert production systems to find ways to reduce the high salt content often associated with irrigated lands.

If your interests lie in meteorology, climatology, or plant ecology, you may help determine if new crops can be grown in locations where the environment cannot be controlled.

Using remote sensing and images from orbiting satellites, you might map earth's resources. You might even find yourself working in space.

Yearly Employment Opportunities for College Graduates through 1990



Source: Employment Opportunities for College Graduates in the Food and Agricultural Sciences, published by Higher Education Programs, U.S. Department of Agriculture, Washington D.C.

WE DEPEND ON A PROFESSIONAL TEAM

The U.S. Department of Agriculture predicts that through 1990 our nation's food and natural resource system will need more than 48,000 new college graduates each year.

Nearly one-half of the projected opportunities are in business: for financial managers and marketing specialists with food and agricultural expertise.

One fourth to one third of the job openings will be for food and agricultural scientists, engineers, and technologists.

About one fifth of the openings will be for producers, natural resource managers, and communication specialists with expertise in food, agriculture, or natural resources.

Come and look for a future with us.

We need you to "energize the green machine," whether on earth or in space.

- Plant Scientist
- Animal Geneticist
- Food Microbiologist
- Agricultural Engineer
- Biochemist
- Technical Sales Representative
- Market Analyst
- Financial Manager
- Commodity Broker
- Wood Scientist
- Agricultural Journalist
- Landscape Architect

OF CAREERS

- University Professor
- Information Systems Manager
- Public Relations Specialist
- Forest Manager
- Nutritionist
- Wildlife Manager
- Soil & Water Scientist
- Remote Sensing Scientist
- Farmer/Rancher
- Range Manager
- Resource Economist
- Biometrician
- Food Engineer

For more information, write to Dean of Agriculture, Natural Resources, or Forestry at one of the following:

Alabama Agricultural &
Mechanical University
Normal, AL 35762

Alcorn State University
Lorman, MS 39096

Angelo State University
San Angelo, TX 76901

Arizona State University
Tempe, AZ 85281

Arkansas State University
State University, AR 72461

Arkansas Technical University
Russellville, AR 72801

Austin Peay State University
Clarksville, TN 37040

Auburn University
Auburn, AL 36830

Ball State University
Muncie, IN 47302

Brigham Young University
Provo, UT 84601

California Polytechnic State University,
San Luis Obispo
San Luis Obispo, CA 93407

California State Polytechnic
University, Pomona
Pomona, CA 91768

California State University, Chico
Chico, CA 95929

California State University, Fresno
Fresno, CA 93740

Cameron University
Lawton, OK 73501

Central Missouri State University
Warrenburg, MO 64039

Clemson University
Clemson, SC 29631

College of the Virgin Islands
St. Croix, USVI 00850

Colorado State University
Fort Collins, CO 80523

Cornell University
Ithaca, NY 14853

Community College of Micronesia
Ponape, East Caroline Islands 96941

Delaware State College
Dover, DE 19901

Delaware Valley College of Science &
Agriculture
Doylestown, PA 18901

Duke University
Durham, NC 27706

East Texas State University
Commerce, TX 75428

Eastern Kentucky University
Richmond, KY 40475

Eastern New Mexico University
Portales, NM 88130

Eastern Oregon State College
LaGrande, OR 97850

Florida Agricultural & Mechanical
University
Tallahassee, FL 32307

Fort Hays State University
Fort Hays, KS 67601

Fort Valley State College
Fort Valley, GA 31030

Humboldt State University
Arcata, CA 95521

Idaho State University
Pocatello, ID 83201

Illinois State University
Normal, IL 61761

Iowa State University
Ames, IA 50011

Johnson State College
Johnson, VT 05656

Kansas State University
Manhatten, KS 66506

Kearney State College
Kearney, NE 68847

Langston University
Langston, OK 73050

Lincoln University
Jefferson City, MO 65101

Louisiana State University
Baton Rouge, LA 70803

Louisiana Tech University
Ruston, LA 71272

McNeese State University
Lake Charles, LA 70601

Michigan State University
East Lansing, MI 48824

Michigan Technological University
Houghton, MI 49931

Middle Tennessee State University
Murfreesboro, TN 37130

Mississippi State University
Mississippi State, MS 39762

Missouri Western State College
St. Joseph, MO 64507

Montana State University
Bozeman, MT 59717

Morehead State University
Morehead, KY 40351

Murray State University
Murray, KY 42071

New Mexico State University
Las Cruces, NM 88003

Nicholls State University
Thibodaux, LA 70301

North Carolina Agricultural & Technical
State University
Greensboro, NC 27411

North Carolina State University
Raleigh, NC 27695

North Dakota State University
Fargo, ND 58105

Northeast Louisiana University
Monroe, LA 71201

Northeast Missouri State University
Kirkville, MO 63501

Northern Arizona University
Flagstaff, AZ 86011

Northern Michigan University
Marquette, MI 49855

Northwest Missouri State University
Maryville, MO 64468

Northwestern Oklahoma State
University
Alva, OK 73717

Northwestern State University of
Louisiana
Natchitoches, LA 71457

Oklahoma Panhandle State University
Goodwell, OK 73939

Oklahoma State University
Stillwater, OK 74078

Oregon State University
Corvallis, OR 97331

Prairie View A&M University
Prairie View, TX 77446

Purdue University
West Lafayette, IN 47907

Rutgers University
New Brunswick, NJ 08903

Sam Houston State University
Huntsville, TX 77341

South Carolina State College
Orangeburg, SC 29115

South Dakota State University
Brookings, SD 57006

Southeast Missouri State University
Cape Girardeau, MO 63701

Southeastern Louisiana University
Hammond, LA 70402

Southeastern Oklahoma State
University
Durant, OK 74701

Southern Arkansas University
Magnolia, AR 71753

Southern Illinois University
Carbondale, IL 62901

Southern University
Baton Rouge, LA 70813

Southwest Missouri State University
Springfield, MO 65802

Southwest State University
Marshall, MN 56258

Southwest Texas State University
San Marcos, TX 78666

Stephen F. Austin State University
Nacogdoches, TX 75962

Sul Ross State University
Alpine, TX 79830

SUNY College of Environmental
Science & Forestry
Syracuse, NY 13210

Tarleton State University
Stephenville, TX 76402

Tennessee State University
Nashville, TN 37203

Tennessee Technological University
Cookeville, TN 38505

Texas A&I University
Kingsville, TX 78363

Texas A&M University
College Station, TX 77843

Texas Tech University
Lubbock, TX 79409

The Ohio State University
Columbus, OH 43210

The Pennsylvania State University
University Park, PA 16802

Tuskegee University
Tuskegee, AL 36088

University of Alaska
Fairbanks, AK 99775

University of Arizona
Tucson, AZ 85721

University of Arkansas
Fayetteville, AR 72701

University of Arkansas at Monticello
Monticello, AR 71655

University of Arkansas at Pine Bluff
Pine Bluff, AR 71601

University of California, Berkeley
Berkeley, CA 94720

University of California, Davis
Davis, CA 95616

University of California, Riverside
Riverside, CA 92521

University of Connecticut
Storrs, CT 06268

University of Delaware
Newark, DE 19717

University of Florida
Gainesville, FL 32611

University of Georgia
Athens, GA 30602

University of Guam
Mangilao, Guam 96923

University of Hawaii
Honolulu, HI 96822

University of Idaho
Moscow, ID 83843

University of Illinois
Urbana, IL 61801

University of Kentucky
Lexington, KY 40506

University of Maine
Orono, ME 04469

University of Maryland
College Park, MD 20742

University of Maryland, Eastern Shore
Princess Anne, MD 21853

University of Massachusetts
Amherst, MA 01003

University of Michigan - Ann Arbor
Ann Arbor, MI 48109

University of Minnesota
St. Paul, MN 55108

University of Missouri
Columbia, MO 65211

University of Montana
Missoula, MT 59812

University of Nebraska, Lincoln
Lincoln, NE 68583

University of Nevada
Reno, NV 89557

University of New Hampshire
Durham, NH 03824

University of Puerto Rico
Mayaguez, PR 00708

University of Rhode Island
Kingston, RI 02881

University of Southwestern Louisiana
Lafayette, LA 70504

University of Tennessee
Knoxville, TN 37901

University of Tennessee at Martin
Martin, TN 38238

University of the District of Columbia
Washington, DC 20008

University of Vermont
Burlington, VT 05405

University of Washington
Seattle, WA 98105

University of Wisconsin - Madison
Madison, WI 53706

University of Wisconsin - Platteville
Platteville, WI 53818

University of Wisconsin - River Falls
River Falls, WI 54022

University of Wisconsin - Stevens Point
Stevens Point, WI 54481

University of Wyoming
Laramie, WY 82071

Utah State University
Logan, UT 84322

Virginia Polytechnic Institute & State University
Blacksburg, VA 24061

Virginia State University
Petersburg, VA 23803

Washington State Unversity
Pullman, WA 99164

West Texas State University
Canyon, TX 79015

West Virginia University
Morgantown, WV 26506

Western Illinois University
Macomb, IL 61455

Western Kentucky University
Bowling Green, KY 42101

Western Michigan University
Kalamazoo, MI 49001

Western Montana College
Dillon, MT 59725

Yale University
New Haven, CT 06520

Also, you may write to: Food and Agricultural Careers for Tomorrow, School of Agriculture, Purdue University, West Lafayette, IN 47907.

Other colleges and universities offer related programs and are also excellent sources of information.

Editors: Allan D. Goecker and Rebecca J. Goetz

Artists: Ed Blackwell and Jeff Grinstead

Photographers: Purdue University Agricultural Communication Service and University News Service, U.S. Department of Agriculture, and Karen E. Deighton

Producer: Food & Agricultural Careers for Tomorrow, Co-sponsored by U.S. Department of Agriculture, Higher Education Programs, and Purdue University, School of Agriculture. An equal access/equal opportunity university

Issued in furtherance of higher education in the food and agricultural sciences, the National Agricultural Research, Extension, and Teaching Policy Act of 1977, as amended.